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Vol. VIII

SEPTEMBER, 1924

No. 3

AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

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PUBLISHED BY C. V. MOSBY COMPANY, 506 NORTH GRAND BLVD., ST. LOUIS, U. S. A.

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The American Journal of Obstetrics and Gynecology

VOL. VIII

ST. LOUIS, SEPTEMBER, 1924

No. 3

Original Communications

THE RELATION OF VENEREAL DISEASES TO CHILDBIRTH*

BY EDWARD A. SCHUMANN, M.D., PHILADELPHIA, PA.

CONCEPTION taking place in a woman who is the victim of venereal disease, carries with it potentialities of peril both to the mother and the child, the extent of which may only be measured by the virulence of the infecting organisms. Gonorrhea, syphilis, chancre and that bizarre lesion, granuloma inguinale, are all stimulated as to the severity of their manifestations by pregnancy, and in the presence of two of them at least, the child is in grave danger even to its life.

This communication proposes to deal with the less settled phases of the subject and to invite expression of opinion as to the many unsolved problems and relationships which meet the clinician in his contact with venereal diseases complicating pregnancy and labor.

Gonorrhea and pregnancy may be associated in one of three ways:—1st, the gonorrhea may have antedated the pregnancy, the lesion remaining active being an endocervicitis, a mild nonobstructive salpingitis or both; second, the gonorrhea may have been contracted coincidentally with impregnation, and third the disease may be acquired while the woman is in the pregnant state. Naturally by far the greater number of patients fall into the first group, the second and third being relatively insignificant as to numbers, but of great importance as regards the gravity of the coexistent condition.

The hyperemia and succulence of the pelvic organs in pregnancy tend to intensify the reaction of the tissues to gonorrheal infection as well as to stimulate the multiplication of the bacteria and this aggravation of the disease proceeds in almost direct ratio to the acuteness of the infection.

*Read at a joint meeting of the Philadelphia Obstetrical Society and the New York Obstetrical Society, held in New York, April 8, 1924.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

Extension of a gonorrheal urethritis and cervicitis to the endometrium and tubes during pregnancy is a common event. Even latent gonorrhea may become active at this time and give rise to extensive destructive inflammatory change in the uterus and adnexa. That the tubal infection has occurred subsequent to conception may be proved by the fact that so many of these tubes are occluded, the fimbriæ being glued together by inflammatory exudate.

This is the mechanism underlying many of the cases of one child sterility, the causation of which is sometimes so difficult to ascertain.

The frequency of gonorrhea as a complication of pregnancy is astonishing if one may believe the published statistics. From the 25 to 50 per cent incidence in the series of Zwow, Gurd and Sängner even to the low estimate of between 5 and 10 per cent made by Harrar, Taussig, and others, the occurrence of this complication is distressingly high.

I believe that all these series give an erroneous impression as to a cross section of the population, since they are mostly based on dispensary patients, with a high proportion of Negroes among them.

In the author's private practice in 150 cases seen since the routine cervical smear has been a part of his prenatal study, but one positive slide has resulted, and that a doubtful one which was not confirmed upon subsequent examination. Such figures which must be common experience with all of us, lead one to believe that the generally accredited coincidence neisserian infection in pregnant women is grossly overestimated.

As a cause of unfecond marriage, however, the gonococcus stands easily in first place. If to the frequent sterility in the male there be added the cases in which dyspareunia and condylomata prohibit intercourse as well as the obstructive lesions of the tubes, the perioophoritis and endocervicitis which are so commonly the termination of the infection, the effect upon the limitation of conception is unquestioned.

Even should conception take place in a gonorrheic woman, the possibility, indeed probability, of abortion as a result of decidual endometritis or the lighting up of a pelvic peritonitis is very great.

There is a commonly accepted belief that the gonococcus is an active causative agent in the production of puerperal sepsis, but this opinion is, I think, subject to grave doubt. Sängner's statement that 15 per cent of women suffering from gonorrhea at the time of delivery develop puerperal infection (Sängner, quoted by Norris: *Gonorrhea in Women*, Saunders, 1913, p. 358) may be true but if one considers that the incidence of the gonococcus in the pelvic organs of the pregnant woman is at best uncommon, its importance as a general cause of infection during the puerperium must be slight. Furthermore, it has been shown by Curtis (Curtis, A. H.: *Bacteriology and Pathology of Fallopian Tubes Removed at Operation*. Trans. Amer. Gyn. Soc., 1921, 257) that the tube is not a focus for chronic gonorrheal infection, although it is true that when a salpingitis of gonorrheal origin has damaged the

structure of the tube, the resistance is lessened and the invasion of bacteria, as the streptococcus, staphylococcus and coli communis in numbers which would have no effect upon normal tissues, may readily produce destructive results.

The arraignment of neisserian infection as a complication of the child-bearing process cannot be dismissed without mention of its significance in the causation of ectopic gestation.

It is generally conceded that this accident most commonly follows a healing salpingitis, or one in which there is no present inflammation but wherein the lumen of the tube is narrowed by adhesion kinks or masses of exudate. Inasmuch as these are the characteristic lesions of gonorrhea, it follows that this disease is an exceedingly widespread and pernicious agent in producing tubal pregnancy.

The above generalizations lead naturally to definite conclusions as to the management of gonorrhea complicating pregnancy about as follows:

If vulvar or cervical infection be manifested during gestation, every effort should be made to localize the disease and to prevent its ascent to the decidua and the tubes. All traumatization of tissues is dangerous, and vigorous manipulation should be avoided to prevent possible abortion as well as to limit the area of infection.

A satisfactory plan is to gently coat the entire vagina and cervix with a 20 per cent argyrol solution at weekly intervals and to instruct the patient to fill the vagina with a 10 per cent solution of the same drug daily, using from two to four ounces, instilled by means of a soft rubber ear syringe and held in place for twenty minutes by closing the labia with the fingers.

Old chronic endocervicitis requires treatment chiefly upon indication of a profuse, irritating leucorrhea which often gives rise to intense discomfort by its excoriating action upon the skin of the pudenda.

The free use of a powder composed of equal parts sodium bicarbonate and Fuller's earth, installed into the vagina and retained for forty-eight hours by means of a cotton tampon, will usually so diminish the secretion that the symptoms are promptly allayed.

Upon the onset of labor, the question of ophthalmia arises and is met by frequently flushing the birth canal with a 10 per cent argyrol solution during the progress of labor. Enough argyrol is used to thoroughly bathe the vaginal and cervical mucosa and the solution should not be sponged away or withdrawn but permitted to lie in the vagina until expelled by the contractions incident to the labor. The management of the infant's eyes needs no discussion.

Gentleness of manipulation and a minimizing of the tissue trauma are matters of the utmost importance in the conduct of labor in a woman suffering from gonorrhea.

Early resort to forceps or version, Credé expression of the placenta, vigorous massage of the uterus; all these practices tend toward the re-

lighting of an old, possibly mild salpingitis with its potentialities for severe infection of the pelvic structures. Indeed, the entire management of pregnancy complicated by gonorrhea may be well summed up in the motto which surmounts the entrance to one of our prominent surgical clinics, "noli loqui, noli tangere."

In this skeptical age, when we feel that the art of medicine is an old wife's tale and that the recognition and management of disease has been carried beyond all empiricism and become reduced to a mathematical formula, it is good to occasionally receive a distinct blow to our self-esteem as exemplified by the instance of what has been alluded to as that bizarre lesion, granuloma inguinale.

That a disease, well known, regularly diagnosed and successfully treated in South America and in Asia for many years, should have repeatedly presented itself, indeed, have been practically endemic in most of our larger hospitals for more than a half century, without recognition, masquerading under a diversity of erroneous diagnoses and as diversely treated albeit always without success; such a state of affairs serves well to make us pause and consider—and perhaps to return for a moment to "humility and modest stillness."

The records of the Philadelphia Hospital show that granuloma inguinale has been regularly present in the wards for years, as has been pointed out by Randall in his very complete paper on this subject (Randall, Small & Belk. *Granuloma Inguinale*, *Surg. Gyn. & Obst.*, xxxiv, 1922, 717).

The nature of the lesion was not understood, however, until the paper of Symmers and Frost (*Jour. Am. Med. Assn.*, 1920, lxxiv, 1304) called attention to the fact that this supposedly tropical disease might be endemic in this latitude. A deal of time might be consumed by a discussion of so unusual and refractory a lesion, but its effect upon child-bearing is so comparatively unimportant, that a brief resumé of the relationship will suffice.

From the very nature of the disorder it follows that conception among women so afflicted is most exceptional. The huge, proliferating masses, simulating immense condylomata, with their areas of cicatrization and of raw granulating surface, the odor foul from secondary filth infection and the discharge profuse especially in the older cases, together with the chronicity of the disease, render pregnancy an obviously uncommon sequela. However, the two conditions do exist coincidentally and when they do, two considerations must be born in mind in the management of the patient.

Owing to the location and nature of the lesion, vaginal delivery is almost always impracticable and cesarean section is the advisable measure to which to resort. Treatment with tartar emetic, the accepted method, or any other form of therapeutics, gives no relief during pregnancy, the affected areas becoming steadily greater in extent and the activity

of the process increasing. Rapid and severe anemia usually accompanies the imposition of pregnancy upon granuloma and the patient is apt to prove a poor operative risk on this account unless active hematinic treatment is instituted. For these reasons also, delivery, by section, should be accomplished so soon after the viability of the child is established as will give it a proper chance for life.

One illustrative case is presented here.

A. L., negress, twenty-four, was admitted to the Philadelphia General Hospital, April 3, 1923, suffering from an advanced granuloma inguinale (Fig. 1). She was married and six months pregnant and despite very active treatment the lesion progressed with considerable rapidity. July 10, 1923, my colleague, Dr. McGlinn (to whom I am indebted for permission to record this portion of the history) per-



Fig. 1.—Granuloma inguinale. Photo taken after cesarean section, August 6, 1923.

formed a conservative cesarean section, with the uneventful recovery of mother and child. During the puerperium active treatment with tartar emetic was resumed with the prompt regression of the lesion and in August the patient and child were discharged, in good condition.

The woman menstruated again in September and then became pregnant again, the granuloma appearing shortly after conception and spreading with great rapidity.

She is now in the writer's service at the hospital (Fig. 2) receiving tartar emetic intravenously without benefit and awaiting a second section upon the complete viability of the child. Unfortunately, recurrences of this condition are common and are especially prone to occur when pregnancy supervenes.

The mere mention of the words syphilis and childbirth in combination, brings to the mind the many fascinating problems of biology, disease transmission and antenatal therapeutics which arise when these two conditions occur simultaneously.

Proteus, in form indefinite and intangible, chameleon in colors changing without cessation, and increasingly deceptive, a last plague from Pandora's box, a prodigy fallen from the stars, to quote the poetical Frascator; nowhere does the great destroyer more patently reveal its power than in the appalling death rate it imposes upon the fetus.

J. W. Williams finds syphilis to constitute the most important single factor concerned in the causation of fetal death, it being responsible for 34.4 per cent of all the infant fatalities occurring between the period of viability and the first two weeks after birth, in his material, while in a series of cases studied by Barnes and myself at the Philadelphia

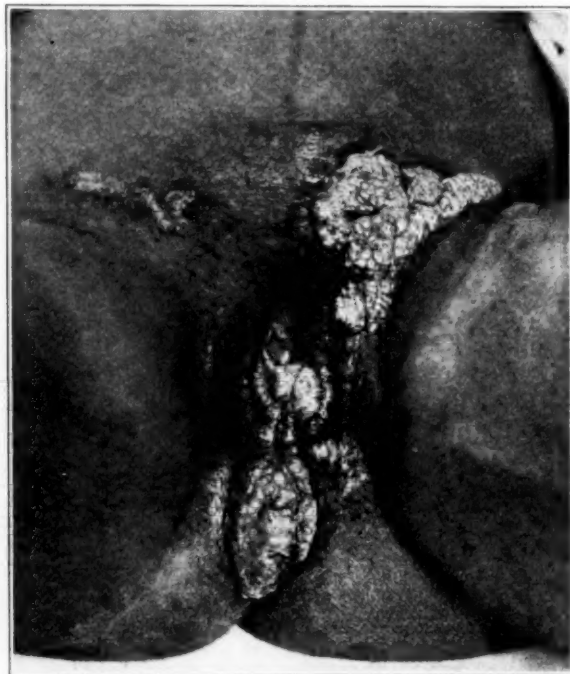


Fig. 2.—Same patient, showing condition March 19, 1924, again seven months' pregnant and awaiting delivery by section.

General Hospital there were 10 per cent stillbirths among 192 Wassermann positive women and only 1.8 per cent among 469 where the Wassermann reaction was negative. These figures deal only with stillbirths and not with abortion or death during the first two weeks of life and are therefore comparatively low as to death rate.

On the other hand, again referring to more of William's statistics, we find the encouraging information that of the children born to 169 women presenting a positive Wassermann during pregnancy, but not subjected to treatment of any sort, 51.5 per cent showed no evidence of syphilis, 33.7 per cent had a definite syphilis while in 14.7 per cent the results were doubtful.

In the series studied by Barnes and the writer, 48.4 per cent of syphilitic women gave birth to living and healthy children who disclosed no clinical or serological evidences of having been infected, up to the time of their discharge from the hospital.

These figures naturally lead to certain questions regarding the prognosis to, and management of, pregnant women suffering from syphilis, both as to the mothers themselves and their prospective infants.

1. What outcome of a pregnancy may be expected by a woman, who first learns that she has syphilis during her pregnancy, as a result of prenatal examination?

2. How may this outcome be affected both as to mother and child by intensive treatment during pregnancy?

3. What chance of producing healthy children in subsequent pregnancies, has such a woman provided adequate treatment be instituted and maintained?

4. What proportion of unrecognized and untreated syphilitics give birth to children showing no sign of the disease and persistently Wassermann negative?

5. What of Colles' law? Is there a possibility of paternal transmission of syphilis, the mother remaining free?

Let it be understood at the outset that none of these queries are to be answered definitely in this communication, but my conclusion from a study of the literature and my own experience will be very timidly presented.

Pregnancy occurring in an untreated syphilitic, may be reasonably supposed to eventuate in the birth of a living and healthy infant in about one-half of the cases, the child in this proportion showing no evidence of syphilis. About one-third of the patients produce syphilitic children either living or dead, stillbirths or macerated premature infants comprising about 10 per cent of the whole number in the statistics here studied. The remaining one-sixth are indefinite as to the presence or absence of syphilis.

These figures are far more encouraging than the generally prevalent pessimistic views regarding the transmission of this affection, would lead us to believe, but they are supported by the careful survey of several large series of cases and help to explain the fairly stationary incidences of syphilis in the world.

If one stops to consider the progressive rate of any disease which is directly and invariably transmitted from an affected mother to her offspring, it becomes readily apparent that if such hereditary transmission of lues were inevitable, the proportion of diseased persons would increase to an enormous extent within the epoch of but a few generations. Such, of course, has not been the case.

Next, how may the outcome of pregnancy in a syphilitic woman be affected by intensive treatment during gestation?

Here we have most encouraging results to present. A. C. Beck recently reported the end results of prenatal care in 1000 consecutive cases (Beck, A. C., End Results of Prenatal Care, (*Jour. Amer. Med. Assn.*, 1921, lxxvii, 457) among whom there were 30 cases of syphilis intensively treated. By intensive treatment is meant the weekly intravenous administration of salvarsan for six weeks; followed by six weekly injections of mercury alone. Among the 30 cases reported by Beck there resulted one stillbirth, one death 24 hours after birth and one in the seventh week of life from pneumonia. The first two fatalities were presumably due to syphilis, the third presumably not so, leaving a syphilitic death rate of 6.66 per cent. The remaining 27 babies did well, 6 of them showing some evidence (22.6 per cent) while the remaining 19 were well and presented no stigma of the disease (70 per cent +).

The third question propounded was what chance of producing healthy children in subsequent pregnancies has a syphilitic woman provided adequate treatment be instituted and maintained? Williams' standard of efficient treatment is defined as at least six doses of diarsenol followed by mercurials and iodides and the repetition of this treatment after the Wassermann reaction becomes negative and remains so for at least one year after the cessation of treatment. Williams studied 49 such patients, some of whom had enjoyed the most efficient treatment as outlined above, some had not received such intensive care but all had been at least actively and intelligently handled.

Before beginning treatment these 49 women had passed through 172 pregnancies with 102 fetal deaths, or 59.3 per cent. After treatment the same 49 went through 85 pregnancies with three fetal deaths or 3.5 per cent.

This query may then be definitely answered by saying that provided that adequate and persistent treatment be employed, a woman may reasonably expect the birth of a healthy child with but slightly greater chance of a fetal mortality than had she not suffered from the disease at all.

Next, what of Colles' and Profeta's laws, are they scientifically unsound and clinically disproved?

In 1837 Abraham Colles promulgated the view that a child might inherit syphilis from its father, the infective agent entering the ovum with the spermatozoon, and that the mother of such a child, not only might escape lues, but would remain immune to infection from her own child while others would be infected by it. This law came to receive general acceptance and not until 1907 and the Wassermann reaction, was any serious question raised as to its correctness although the discovery of the spirocheta by Schaudinn in 1903 had cast some doubt upon it. At present the extreme views of what one might call the Wassermannists still carry with them the bulk of medical opinion that Colles' law is untrue and that the mother of a syphilitic infant always was

a victim of the disease although it might be present in a latent form, having never given rise to clinical signs. This opinion was greatly strengthened by the fact that inasmuch as the spirochete is at least three times as large as the spermatozoon, it was manifestly impossible for the latter to convey so heavy a burden with it into the ovum. Furthermore, as a spore or larval state of the spirochete has not been demonstrated, it could not be proved that any immature form of this organism existed to be carried into the ovum.

I have long felt that clinical experience supports the older view of Colles, and that in spite of all the weighty objections against it, the facts speak eloquently for the truth of the theory of parental infection of the ovum. It was therefore with great pleasure that I found a similar opinion expressed by Professor Williams in his paper before the American Gynecological Society in 1920.

The behavior of the Wassermann reaction in pregnant women is so uncertain that it would seem as though some as yet unknown factors exercised a powerful influence. For example, is it not remarkable to suppose that the placenta may act as a barrier to the transmission of spirochetes themselves from child to mother but that a certain amount of syphilitic toxin may enter the maternal blood stream and so account for the feeble, fugitive and variable reaction sometimes observed in these women? Menten's interesting paper brought out the fact that in about one-half of her positive cases the reaction changed from positive to negative sometimes before and sometimes after delivery, without therapeutic or other reason for such change (Menten, Maud L.: *Amer. Jour. Obst.*, 1918, lxxviii, 514).

Finally, is the reverse of Colles' law, the formula devised by Profeta, correct or not? This view holds that a syphilitic woman may give birth to a child that is free from the disease and that never presents any manifestations of syphilis whatever.

That it is true needs no proof other than that already adduced in the foregoing statistics and in the commonplace fact that no disease or indeed any other physiologic or morphologic characteristic is invariably transmitted from parent to child,—a large proportion of the offspring, approximately one-half, escaping infection in the matter of syphilis.

The inevitable conclusion reached from an analysis of the relationship of venereal diseases to childbirth, is that with the steady increase of careful prenatal examination, the early recognition of these diseases and their active and persistent treatment, the power they possess of destruction of fetal life and maternal health is vastly diminished. It seems fair to assume that if equal progress be made in the next two decades as has just been recorded as taking place in the past two, these diseases will have largely lost their position as the chief destroyers of infant life.

MORPHINE AND MAGNESIUM SULPHATE AS AN OBSTETRICAL ANALGESIC*

BY THEODORE W. ADAMS, M.D., ANN ARBOR, MICH.

(*Instructor in Obstetrics and Gynecology, University of Michigan.*)

NITROUS oxide gas affords to the obstetrician a safe and satisfactory method of decreasing the pain of childbirth. Its proper administration, however, is attended with a definite expense for it requires the presence of a person familiar with the technic of anesthesia and a suitable machine is necessary for its administration. One or more of these factors are often inaccessible to the accoucher. There exists a place, therefore, for some method of relieving the pain of labor which is both simple and inexpensive.

Gwathmey,¹ in 1921, advocated the preoperative injection of magnesium sulphate and morphine as a means of reducing the amount of inhalation anesthetic necessary for operative procedures.

In the same year Curtis² reported the use of the same drugs for a similar purpose. He also reported a death following their use where, at autopsy, deleterious effects of the magnesium sulphate were found in the liver tissues. However, both Gwathmey and Curtis used two to four hundred cubic centimeters of a four per cent solution, a total dose of magnesium sulphate of over eight times as much as that used in any of the following experiments.

Gwathmey also found that magnesium sulphate given hypodermatically with morphine markedly prolongs and intensifies the sedative action of the latter drug. During the winter of 1923 magnesium sulphate in conjunction with morphine was given after operations to many of the patients in the gynecologic service of the University Hospital. It was found that one-eighth of a grain of morphine sulphate when given with two cubic centimeters of a twenty-five per cent solution of magnesium sulphate afforded greater postoperative relief than a quarter of a grain of morphine given alone.

At the time the following work was undertaken at the maternity ward of the University Hospital, no reference to the use of magnesium sulphate and morphine as an obstetrical analgesic could be found in the literature. Because of their marked effect of postoperative pain it was decided to study the action of these drugs on labor pains. Since then, Gwathmey³ in conjunction with Donovan, O'Regan and Cowan, published an article on "Painless Childbirth

*From the Department of Obstetrics and Gynecology, University of Michigan.

by Synergetic Methods," in which morphine and magnesium sulphate play an important role.

METHOD

A twenty-five per cent solution of chemically pure magnesium sulphate was kept in stock. The required amount of this solution as the occasion demanded was sterilized by fractional boiling. It was then drawn up into a sterile hypodermic syringe and the desired amount of morphine sulphate added. The injections were made intramuscularly, the deltoid muscle being the common site of injection.

The cases used in the following experiments were in no way selected. They were composed of the general run of maternity cases entering the obstetrical ward, in which labor had started and where contractions were of such a nature as to cause the patients to complain of pain.

In all, morphine and magnesium sulphate were given to sixty patients. Of these six were multiparae and fifty-four primiparae. The youngest patient was fourteen and the oldest thirty-nine years of age. The average age was twenty years. All were at term and all started labor spontaneously.

The total length of labor was not prolonged. As can be seen from the comparative table, Table I, it was even slightly shorter than the average length of normal labor as found by Williams⁶ and DeLee³.

TABLE I
COMPARATIVE LENGTH OF LABOR

	1ST STAGE			2ND STAGE			3RD STAGE			TOTAL		
	Present Series	DeLee	Williams	Present Series	DeLee	Williams	Present Series	DeLee	Williams	Present Series	DeLee	Williams
Primiparae	14 hr.	16 hr.	16 hr.	2 hr.	1¾-3 hr.	1¾-2 hrs.	14 min.	few min. to hours	¼-½ hr.	16¼ hrs.	18 hrs.	18 hrs.
Multiparae	5 hr.	12 hr.	11 hr.	45 min.	¼-½ hr.	1 hr.	15 min.	few min to hours	¼-½ hr.	6 hrs.	13 hrs.	12 hrs.

Postpartum bleeding was not excessive. Even if one case in which sixty ounces of blood were lost due to a deep cervical laceration be included, the average amount of blood lost following the birth of the baby was still within the normal limits. In no case except the one just mentioned was there postpartum hemorrhage either immediate or delayed. The uterus at all times retained a good tone and no abnormal tendency to relaxation was noted. Table II gives the average amount of blood lost as compared with that found by various authors in normal deliveries.

Since Cron's¹ work on pituitrin in the third stage of labor it has

TABLE II
COMPARATIVE POSTPARTUM BLEEDING

PRESENT SERIES	DELEE ⁶	WILLIAMS ⁷	CRON ⁸
294 c.c.	240-300 c.c.	343 c.c.	255 c.c.

been the custom in a great many deliveries at the University Hospital to give one ampule of pituitrin intramuscularly following the end of the second stage. Thirty-five of the sixty cases in the present series were thus treated. These showed an average loss of 330 cubic centimeters as compared with an average of 270 cubic centimeters in the twenty-five cases where no pituitrin was given. Therefore, it is not felt that the pituitrin lessened in any way a tendency for the magnesium sulphate and morphine to increase postpartum bleeding, did it possess such an action.

In no case was there any deleterious effect to the mother either immediate or delayed, which could in any way be attributed to the magnesium sulphate and morphine. There were no cases of sloughing at the site of injection and no increased tendency to nausea and vomiting. There was no mortality.

Eighty-five per cent of the children cried spontaneously within one minute of birth. In seven, or 13 per cent, the children were slightly cyanotic at birth, although the heart rate was normal and regular. These children all cried in less than five minutes after slight external stimulation and in none was artificial respiration necessary. In one case (2 per cent) the child was born in pallid asphyxia, gasped a few times but could not be resuscitated. Autopsy revealed an enlarged thymus and the blood Wassermann was four-plus. Although this must be tabulated as a fetal death, it is not felt that death was due to the maternal medication.

In a parallel group of cases, where no magnesium sulphate and morphine had been given, 82.2 per cent cried spontaneously, 13.5 per cent showed evidence of slight asphyxiation and 4.3 per cent were either born dead or in pallid asphyxia.

TABLE III
COMPARATIVE ASPHYXIATION

	BREATHED SPONTANEOUSLY	SLIGHT ASPHYXIA	PALLID ASPHYXIA OR STILLBIRTH
Without medication	82.2%	13.5%	4.3%
With medication	85 %	13 %	2 %

Spontaneous delivery occurred in fifty-four, or 90 per cent of the cases. Five patients, or 8 per cent, were delivered by forceps, and in one case delivery was by cesarean section. In this latter case the mother had a simple flat pelvis and after a reasonable test of labor the head failed to engage.

The indications for forceps extraction were as follows: contracted outlet, funnel pelvis, 2 cases; malposition, unrotated O. P., 2 cases; large child ($10\frac{1}{2}$ pounds), 1 case.

In the series of two hundred ninety-nine cases without medication used as controls, delivery by means of forceps was indicated in twenty-nine or 9.8 per cent of cases.

At first the dose used was one and one-half cubic centimeters of a twenty-five per cent solution of magnesium sulphate and one-eighth grain of morphine. Although the cases treated in this way showed some diminution of pain, it was not until the dose was increased to two cubic centimeters of magnesium sulphate and one-sixth grain of morphine that the more favorable results were obtained. In no case was a single larger dose given. In thirteen cases (21.5 per cent) where the effect of the medication seemed favorable but not lasting, the dose was repeated. The average dilatation at the time of the second dose was four and one-half centimeters.

RESULTS

It is an extremely unsatisfactory task to tabulate the effect of any medication on pain. Both the word of the patient and the external manifestations must be taken into consideration. Under conditions apparently the same as regards the intensity of the pains and what they accomplish, one patient will suffer extremely while another with a different nervous organization will to all appearances suffer very little.

It is a well-known fact that a patient who is suffering pain if kept in a quiet, darkened room will appear to bear up better than if continually bothered by repeated examinations. It is with this handicap that these experiments were carried out, as all patients confined at the maternity ward of the University Hospital are used for teaching material. Each case immediately upon entrance is assigned to a senior medical student whose duty it becomes to follow the case closely by repeated rectal and abdominal examinations. It will be seen, therefore, that these experiments were carried out under conditions far from perfect so far as the patient's state of mind was concerned.

The results of the experiments may be outlined as follows:

(1) No result.—In this class were placed all patients in whom no sedative effects were noted following medication.

(2) Poor result.—These patients received some relief, especially relaxation between contractions, relief of backache, etc., but the contractions could still be felt by the patient and the relief lasted no longer than two to two and one-half hours.

(3) Fair result.—In this group there was some increase of pain at the time of the contractions, but the patient rested comfortably

between contractions. The effect here lasted longer than in the preceding group but gradually wore off as the end of the first stage approached.

(4) Good result.—Here there was great relief from pain both during and between contractions. However, the patient remained conscious and felt a moderate, cramplike sensation at the time of the uterine contractions. In this class the effects lasted until well into the second stage of labor.

(5) Excellent result.—In this class were placed all patients who experienced practically no pain following medication until the fetal head began to distend the perineum. The greater majority of such patients remained in a semi-conscious state, although gentle palpation of the abdomen revealed uterine contraction and relaxation to be continuing normally.

In tabulating the cases according to the above method it was found that the effect depended to a great extent on what time in labor medication was given. The cases have therefore been divided into two groups. In the first the cervix was at least six centimeters dilated at the time of the first dose, that is, the patients were well advanced in the first stage of labor before being given medication. In this group the results were far from satisfactory.

In the second group the medication was given before the cervix was five centimeters dilated, the average dilatation at the time of the first dose being two and one-half centimeters. In this group the results were quite gratifying.

Table IV gives the number and percentage of cases falling in each class.

TABLE IV
COMPARATIVE RESULTS OF MEDICATION

	NO RESULT		POOR RESULT		FAIR RESULT		GOOD RESULT		EXCELLENT RESULT	
	No.	%	No.	%	No.	%	No.	%	No.	%
Medication given after cervix was 6 cm. dilated	0	0	3	42.8	4	57.2	0	0	0	0
Medication before cervix was 5 cm. dilated	4	8	7	13.2	12	21.8	15	28.5	15	28.5
Total	4	6.6	10	16.6	16	26.6	15	25	15	25

From this it can be seen that 6.6 per cent received no result from the medication whatsoever while 93.4 per cent received varying amounts of relief. Twenty-five per cent had extremely easy labors experiencing practically no pain at all until late in the second stage when the pain was very satisfactorily controlled by ether inhalation. This latter procedure was used in the last of the second stage in practically all cases.

It was also interesting to note the increase in relief afforded by ether inhalation in cases where previous medication had been given.

REMARKS

It is realized that the number of cases here reported is far too small to lead to any definite conclusions. However, it is fair to state that in this series at least, hypodermic injection of morphine and magnesium sulphate did, in a large majority of the cases, have a definite sedative action on the pains of labor, without in any way increasing the fetal or maternal morbidity or mortality. It is further felt that this form of treatment possesses possibilities as a simple, inexpensive and apparently harmless method of obstetrical analgesia.

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THE PLACENTAL INFARCT AND ITS RELATION TO THE ETIOLOGY OF DEFORMED BABIES*

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THE placental infarct may be said to be the key unit of much of the pathology of obstetrics. In a recent paper¹ I endeavored to show its significance in relation to much of the pathology of the products of conception. I wish to set forth in detail my observations on one very important phase of the problem, which tend to explain the etiology of deformed babies. In order that the accompanying drawings may be more intelligible, it seems best to explain again the series of observations which have led me to believe that the placental infarct is the result of hematogenous infection of the maternal blood vessels of the placental site.

My observations depend upon the basic conception that a normal placenta enlarges concentrically by proliferation of tissue on its edge. A normal full term placenta is therefore one with the cord attached to the center of the circle made by the circumference of the placenta. The point of cord attachment represents the earliest tissue grown or the beginning of the pregnancy. The tissue on the edge of the placenta farthest away from the cord is the most recent tissue grown.

*Read before the Brooklyn Gynecological Society, Feb. 1, 1924.

Should any injury occur to an area on the proliferating edge of the placenta in the first month of the pregnancy, such an injury would inhibit or prevent further development at that point. Compensatory growth would occur on the uninjured edge to supply the needs of the growing fetus. The cord of such a placenta would therefore be attached very near the edge and the placenta would be of the typical battledore type.

By this deduction it is apparent that the distance from the infarct or injury to the base of the cord, *when the injury is on the edge of the placenta*, gives a reasonable estimate as to the time in the pregnancy when the injury originated.

It is conversely true that a placenta which has the cord attached at or near the edge is the result of some early injury to the placental edge. This statement is supported by the fact that the placental edge nearest the cord attachment generally presents evidence of damage by the presence of white infarction or an absence of active blood vessels on the fetal surface of the damaged tissue.

The work of Pinard² has shown the nature and process of development of the white infarct. He describes "the lesion as characterized by the appearance of hemorrhages which are converted into white infarcts. The primary lesion is hemorrhagic in nature; the white infarct is secondary. In the same placenta may be found recent and old foci and thus very easily the different degrees in the evolution of the placental hematoma may be followed." J. W. Williams³ describes this evolution as a coagulation necrosis. In January, 1923, McNalley and Dieckman⁴ reported work which verified the work of Pinard and found that the white infarct was the end result of a hemorrhagic lesion.

This work is very important because it shows that the lesion is discrete, often repeated in the same placenta and that the white infarct is the end result of an earlier lesion which originated weeks or months before the birth of the placenta.

Is the cause of the hemorrhagic lesion primarily in the placenta or in the uterine blood vessels of the placental site? Willson⁵ concludes from his investigations that "uteroplacental apoplexy is caused by the inundation of the *uterine wall* with a toxin of the nature of a hemorrhagin. Acting on the tissues of the decidua basalis, it produces small areas of hemorrhage which, coalescing, determine retroplacental bleeding and consequent placental separation." In association with this condition he points out that there are similar hemorrhagic areas in other organs of the body. This evidence tends to show that the primary lesion causing the hemorrhage is in the uterine blood vessels.

Since early infarcts are hemorrhagic in nature, it is fair to assume that they may have some relation to uterine bleeding in pregnancy.

Uterine bleeding during pregnancy is a very common event. It is often described as threatened miscarriage. In many cases a miscarriage actually follows such an event, sometimes immediately, more often several days elapse before the products of conception are passed off. Later in pregnancy the event is described as antepartum hemorrhage. Any external bleeding which comes from a hemorrhagic lesion of the placental site must involve and injure the proliferating edge of the placenta and cause a separation. Such an injury would in most cases result in a cessation of further proliferation at the point of injury. The cause of these hemorrhagic lesions is left in doubt. It is the clinical side of this problem on which I have made observations.

My method has been in cases in which there has been bleeding, to observe whether or not there was a white infarct or evidence of damage on the edge of the placenta which would correspond in time by its position in relation to the point of cord attachment to the time in the pregnancy when such bleeding occurred. I have observed 46 cases in which the bleeding spell was so recorded on the placenta. It must be remembered that every infarct does not cause external bleeding. I believe, however, that every bleeding spell which comes from the placental site will leave evidence of damage on the edge of the placenta.

The next step in the problem is to look for evidence as to the cause of the primary hemorrhagic lesion in the uterine blood vessels. There is no better example to emphasize the relation of infection to bleeding in pregnancy and miscarriage than our experience in the influenza epidemic. However, the problem presented itself to me from a different angle.

It has long been my belief that toxemia of pregnancy is due to chronic sepsis. In the disease complex of toxemia of pregnancy infarcts of the placenta are very frequently found. It is also true that antepartum hemorrhage is frequently associated with toxemia of pregnancy. This association suggested the probability that placental infarcts were due to infection of the placental site. Endeavors to prove this point by bacteriologic examinations of placental lesions have not proved successful. De Lee⁶ isolated a staphylococcus from an infarct in a single case twenty years ago.

If infarcts result from foci of chronic infection they would in all probability result from acute infection also. By constantly watching for it, I found that bleeding spells in pregnancy are very frequently preceded by acute infection. During the last three years I have observed twenty-six cases in which uterine bleeding during pregnancy was preceded by demonstrable acute infection.

Realizing that in order to have external bleeding the hemorrhage must be sufficient to dissect its way downward between the chorion

and uterine wall to the vagina, I have also attempted to determine whether or not acute infections were recorded by contemporaneous infarets on the edge of the placenta without bleeding and I have acquired fifty-seven cases in which this was true. One of the most interesting was a case of lobar pneumonia at the fourth month which fortunately went on to full term.

This clinical evidence therefore tends to show three facts:

First, uterine bleeding is preceded by acute infection frequently enough to suggest strongly that the bleeding is the result of the infection.

Second, bleeding from the placental site is recorded on the edge of the placenta by the white infaret or cessation of growth at that point.

Third, acute infection in the head is often recorded on the edge of the placenta by the white infaret or cessation of growth and is therefore strengthening evidence in support of the contention that uterine bleeding is due to infection.

If bacteria from acute infection in the head can cause these lesions by the hematogenous route, bacteria from foci of chronic sepsis can do the same thing. The great frequency of infarets in the placenta is in keeping with the great frequency with which chronic infection is found in the teeth and tonsils plus the incidence of acute infections. It is well recognized that bacteria can migrate from areas of chronic sepsis without giving any outward evidence of the fact. It is equally possible for an infaret to form without giving outward evidence. It is therefore plain that many infarets may form without external evidence. Because many placentas present many infarets without external evidence is no reason for doubting that most infarets are alike as to origin.

Besides this clinical evidence that the infaret is the result of hematogenous infection of the maternal blood vessels of the placental site, there is also histologic evidence found in cases in which the placentas were examined *in situ*. Evidence of infection of the placental site was evident in two cases on record.^{7, 8}

An application of this principle occurred to me in connection with deformed babies. The frequent association of deformed babies with syphilis gave rise at one time to the belief that a deformed baby was evidence of syphilis. The Wassermann test has corrected this view of the situation. However, there is in this frequent association of syphilis with deformed babies the suggestion that the deformity is often an acquired attribute and not hereditary and that it may result from very early infection of the embryo.

The embryo within the first forty days of its development consists in a series of bundles of cells, each bundle having the power of further differentiation into the several parts of the body. Injury to any

one of these bundles would result in a lack of development of that part with distortion of contiguous parts.

The more common deformities are anencephalia, high spina bifida, hydrocephalus, hare-lip and the absence or deformity of some part in the region of the head.

This very marked predominance of malformation in the region of the head is significant when it is considered in relation to the fetal circulation. It will be remembered that the reason that the baby's head is the largest and best developed portion of the body is because the most direct route for the blood coming from the placenta is to the head. If this route brings more food material and oxygen from the placenta to the head, it would likewise account for the increase in damage in the head if the damaging element came from the placenta.

Adopting this view of the situation I determined to watch the placentas of deformed children to see whether or not there was an infarct or evidence of damage to the placenta near the base of the cord to correspond in time to this early damage to the embryo.

I can report twenty consecutive cases of deformed babies which show evidence of placental damage near the base of the cord and are consistent with the theory advanced. The histories and findings in these cases are as follows:

CASE 310. Primipara, age twenty-six. Patient was not seen previous to delivery. Vomiting persisted throughout pregnancy. No bleeding spell. She does not remember any acute infections in first part of pregnancy but has been subject to rheumatism in both arms. Symptoms of toxemia occurred during last week of pregnancy. Blood pressure and urine normal.

At seven months she was delivered normally of a stillborn macerated anencephalic fetus associated with hydramnios. Placenta delivered normally. Cord had relative central attachment with large white infarct at base of cord on fetal surface. No drawing made. The origin of this infarct was a small retroplacental hematoma which did not involve the proliferating edge and therefore did not prevent the concentric enlargement of the placenta.

Subsequent to delivery x-rays of her teeth showed apical areas on both lower left bicuspid which were crowned and the upper right bicuspid showed necrosis of bone. Tonsils were red and adherent to pillars. Septic teeth were extracted and necrotic bone curetted. Later, Nov. 22, 1920, her tonsils were removed.

March 28, 1922, she was delivered of a normal 8 lb. 12 oz. baby. In the middle of December 1921 she had a severe cold which put her in bed for three days followed by a slight showing of blood. No rise in blood pressure, urine normal and no toxic symptoms throughout this pregnancy. There was an area of damage on the placenta consistent with date of the bleeding spell.

CASE 345. Primipara, age twenty-nine. First seen at three months. A bleeding spell had occurred at seven weeks' menstrual date. No record of associated acute infection. No marked toxic symptoms, no rise in blood pressure, and urine was negative throughout. Hydramnios developed rapidly during the sixth month. She was delivered of a stillborn anencephalic fetus, breech presenting. Manual extraction of placenta was necessary. Placenta showed cord attached to edge. No drawing made.

Patient had been subject to tonsillitis and both tonsils were large, the left adherent to pillars. X-ray showed two apical areas on lower left first molar. This tooth was extracted at the fourth month of her second pregnancy which terminated in a normal delivery of an 8 pound 6 ounce baby, Nov. 6, 1921.

CASE 398. Primipara, age twenty-eight. First seen at two months. Last menstrual date March 7, 1920. On April 9 and May 1, she had slight showing of blood. On May 9 another bleeding spell. Extrauterine pregnancy was suspected and at an abdominal operation an acute appendix was removed. Tonsils had been removed at age of 12. X-ray of teeth showed bone destruction at apex of upper left lateral incisor. This was extracted in July. No rise in blood pressure, urine normal and no toxic symptoms after extraction of tooth. Delivery was normal of a 6 lb. 12 oz. baby on Dec. 8, 1920. The right foot showed congenital valgus. The cord was attached to the placenta about one inch from edge, which edge showed two white infarcts. This case has been previously reported (12).

CASE 03. Primipara age thirty-five. Reported by courtesy of Dr. O'Connor. On Jan. 3, 1921 she had what she thought was a period but more scanty than usual. In April she flowed for two weeks, stopped one day and then flowed for two more weeks. Motion began May 16. Membranes ruptured on Sept. 7 and on the 15 she was delivered by version of a 6 pound baby. Baby had only a rudimentary tragus on the right side. The left pinna seemed perfect. The placenta was the typical battledore type with the cord attached to the very edge. This edge showed white infarction. No rise of blood pressure, urinary disturbance or toxic symptoms throughout pregnancy.

Although there was no history of acute infection in the case, the patient had been subject to tonsillitis and neuralgia of the right shoulder. Examination showed that both tonsils were large and although the upper teeth were all false, the lowers were badly decayed and the gums much inflamed. This case has been previously reported (1).

CASE 04. Primipara age thirty-two. Reported by courtesy of Dr. O'Connor. Her last period was on Feb. 4, 1921. Motion felt July 1. She had very large tonsils. Four of her teeth were crowned, two molars were very carious, a retained root was visible in the gums, all associated with pyorrhea. She had been subject to neuralgia of the face. Nausea lasted until the sixth month. Her blood pressure and urine were normal at entrance to the hospital. She remembered that she had had a bad cold at the time she skipped her first period. No bleeding occurred.

On Sept. 24, 1921 she was delivered of twins. One baby was living and weighed 5 pounds. The other was an anencephalic with cervical spina bifida and macerated.

The placentas were separate and not contiguous. The placenta of the living twin seemed normal except for a few small infarcts. The placenta of the anencephalic twin was less than half the size of the other placenta and presented a V-shaped indentation in the circumference, the apex of which was almost contiguous with the base of the cord. A large white infarcted area could be noted in the opposite side of the placenta. This case has been previously reported (1).

CASE 05. Primipara. Reported by courtesy of Dr. O'Connor. Patient was not seen by me. No history of any event in early pregnancy. Teeth, uppers false, lowers very poor. Tonsils not mentioned. Patient was delivered of a baby with lumbar spina bifida by mid-forceps on Nov. 27, 1921. The cord had a relative central attachment to the placenta. At the base of the cord was a white scar with well defined margin and somewhat depressed below the level of the fetal side of the placenta. Histologic examination showed chronic inflammatory tissue running deep into the placenta.

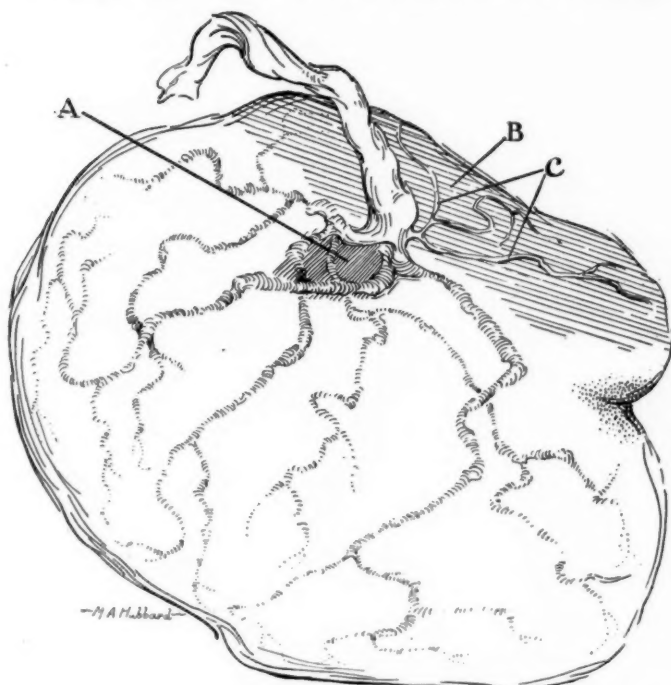


Fig. 1.—Case No. 494. Baby anencephalic. A, white infarct at base of cord on fetal surface; B, an area of damaged placental tissue; C, empty blood vessels.

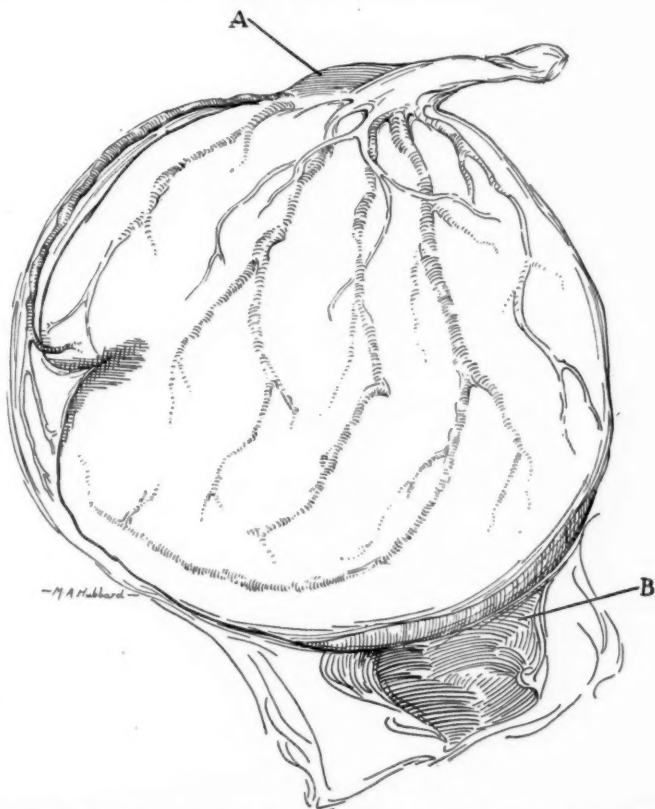


Fig. 2.—Case No. 07. Congenital valvulus. A, white infarct at base of cord. Baby had an unilateral congenital valvulus. B, opening in membranes at edge of placenta and opposite infarct A.

CASE 481. Primipara, age twenty-five. First seen at 7½ months. Last period Jan. 22, 1921. She became sick with grippe Feb. 14 and was in bed two weeks. When first seen the abdomen resembled a full term pregnancy. No fetal heart heard. Diagnosis of hydramnios and deformed baby made at that time. Under marked catharsis, the hydramnios gradually disappeared and the fetal heart became audible in left lower quadrant. Blood pressure rose to 140-100 on October 21, but returned to normal. Urine negative. Mild toxic symptoms present. Motion felt middle of June.

Normal delivery occurred on Dec. 1, 1921 of an apparently healthy child. Marked cyanosis occurred when the baby was given water. The baby died on the fourth day of pneumonia. Autopsy showed that the esophagus did not open into the pharynx but into the trachea. The placenta was unique in the series as it did not show a discrete lesion near the base of the cord. The cord was centrally attached but there was an absence of blood vessels on the fetal surface on opposite quadrants of the placenta and the tissue in these two regions was much firmer than normal placental tissue.

This patient has excellent teeth. Her tonsils, however, had been lanced several times on account of quinsy sore throats. Appendectomy was done in 1919. She has had her tonsils out and on Oct. 14, 1923, gave birth to a normal 8 pound baby after a normal pregnancy. The placenta was symmetrical and the cord was attached very near the center of the placenta.

CASE 494. Multipara, age thirty-three. First seen at 6½ months. Scarlet fever followed by otitis media as a child. Teeth excellent, tonsils very large. Myocardial weakness was evident in both her pregnancies. Both pregnancies were toxic at full term. A miscarriage occurred at three months between them. A few months before the fourth pregnancy started, she had been in bed with inflammatory rheumatism for 53 days.

Last period of her fourth pregnancy May 28, 1921. During the last of June she had a very severe sore throat with recurring sore throats during the next two months. Vomiting persisted throughout this pregnancy. No rise in blood pressure. Urine negative. At 7½ months she was found to be in labor. A diagnosis of hydramnios was made with probable deformed baby and probable infarct at base of cord. The baby was anencephalic and a sketch of the placenta accompanies this article (Fig. 1). This case has been previously reported (No. 1).

CASE 07. Primipara, age thirty-seven, with a blood pressure of 155-95, a trace of albumin in a catheter specimen of urine. She had sound teeth from inspection but with marked pyorrhea. Tonsils were adherent and anterior pillars red. Delivery was normal of a baby with right congenital valgus. The cord attached to the edge of the placenta with a white infarct at its base. Note also that the placenta was of the previa type. (Fig. 2.)

Six days following delivery patient had an acute sore throat followed by an elevated temperature for the next three weeks. A mass developed in the left lower quadrant. Patient left hospital against advice.

CASE 08. Multipara, age thirty-eight. Reported by courtesy of Dr. Adams. First pregnancy, craniotomy. Second pregnancy, Breech stillborn. Third pregnancy, labor induced at 7 months. Baby died. Fourth pregnancy, miscarriage at 3 months. Fifth pregnancy, living. Born on way to hospital to have a cesarean. Sixth pregnancy, cesarean section. Baby living. Seventh pregnancy, notwithstanding the fact that the tubes had been tied off at the last delivery, the patient presented herself at the hospital pregnant again. Patient had nine carious teeth with much pyorrhea and tonsils were inflamed. No definite history of the early events in the pregnancy was obtained. She stated that she had had many colds during this

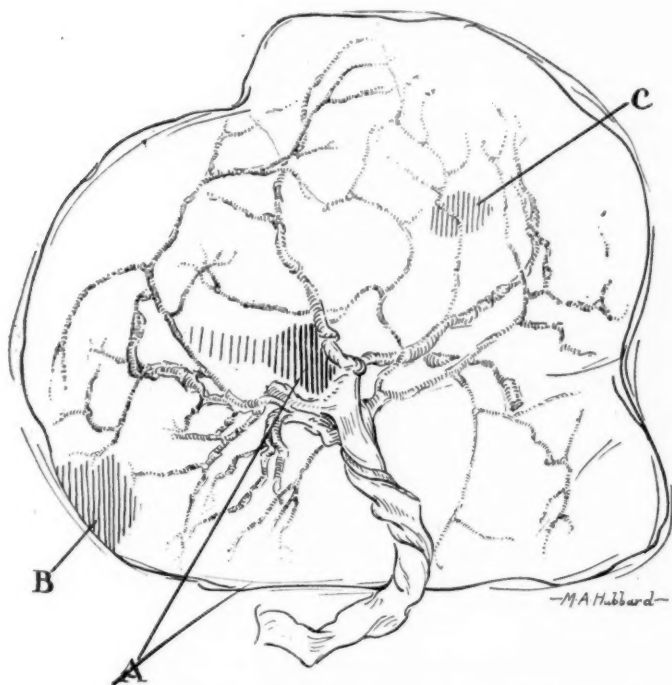


Fig. 3.—Case No. 535. Baby anencephalic. *A*, white infarct on fetal surface at base of cord; *B* and *C*, probably contemporaneous infarcts with no clinical fact associated.

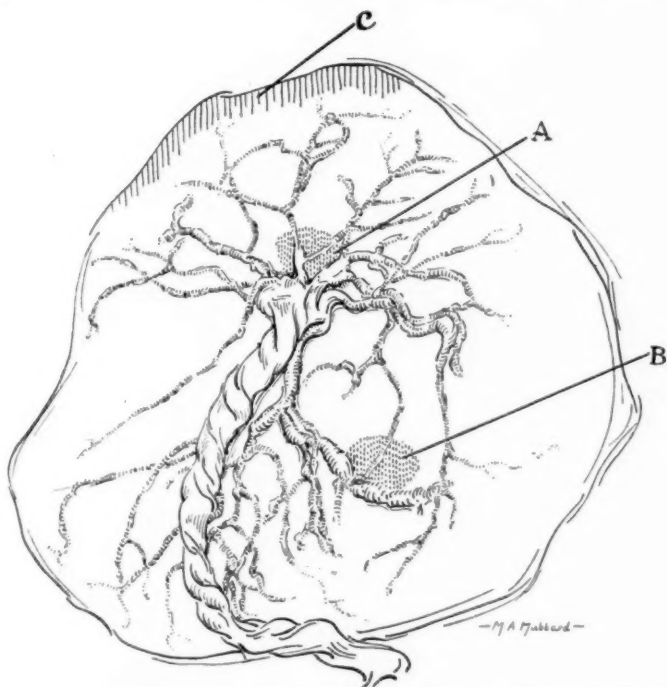


Fig. 4.—Case 09. Harelip. *A*, large white infarct on maternal surface, involving base of cord; *B*, large white infarct on maternal surface; *C*, infarcted edge of placenta.

pregnancy. Another cesarean was done. The baby had toes on the left foot and only the great toe on the right foot. The cord was attached to the edge of the placenta with white infarction along the near edge.

CASE 535. Primipara, age thirty-three. First seen at six months. She had had no serious illnesses but was subject to sore throats. At her first examination moderate hydramnios was present. No fetal heart audible. Her last period was Nov. 17 and she had had some bleeding on January 4. She had had occasional vomiting, numbness of the right hand, occasional dizzy spells and slept poorly. No rise in blood pressure and urine negative. On July 4 she delivered herself normally of an anencephalic baby with cervical spina bifida. The placenta was partially adherent. The cord had a relative central attachment and there was a large white infarct at the base of the cord. (Fig. 3.) Complete x-ray examination of her teeth showed no apical area. The tonsils were small and adherent to pillars.

CASE 09. Multipara age twenty-eight. Reported by courtesy of Dr. Hale. Patient was not seen by me. Her family history was negative as to deformities but several cousins had been mentally deficient. Her first four babies had been normal. The fifth baby, two and a half years old, had a hare-lip on the right side. Her sixth and present pregnancy resulted in another hare-lip baby, the left side being affected this time. The baby was born July 11, 1922. In March, 1921 the patient had had all her teeth out. Previous to that time she had had many old roots and much pyorrhea. In this connection I have had seven patients who had had all their teeth out in whom retained roots were visible in four and were shown to be present with infection by x-ray examination in three. There had been no tonsillar history and the tonsils had not been removed. The cord showed a relatively central attachment. There were no infarcts on the fetal surface. On the maternal surface and almost directly under the base of the cord was a large hard deep white infarct. (Fig. 4.)

There was no evidence to identify the time when this infarct occurred. However the author feels justified in view of the evidence in the other cases in including this case in the series because there was placental damage involving the base of the cord in association with a deformity in the baby.

CASE 011. Multipara, age thirty-six. Reported by courtesy of Dr. O'Connor. Her five previous pregnancies had been normal. Her tonsils were large and she had nine retained tooth roots flush with the gums, with much pyorrhea. Last period Jan. 1, 1922. During the last of January and the first of February she had a very severe cold. She had been troubled with toothache during the pregnancy, excessive vomiting in the early months and during the last three weeks. Blood pressure, 150-85, on admission. Wassermann was negative. She ran an elevated temperature for nine days after delivery on Nov. 13, which was very difficult because the baby was macerated and had ascites. Autopsy showed a heart with one auricle. There were minute hemorrhages in the pleura and the mesenteric lymph glands were enlarged. The cord was attached near the edge of the placenta with a white infarct at the base of the cord and damaged placental tissue between that infarct and the edge. (Fig. 5.)

CASE 575. Primipara, age thirty-one. First seen in eighth month. Had quinsy sore throat three years ago. Tonsils small. Teeth show one gold crown, with pyorrhea. Last period March 3, 1922. On May 15 she had a bleeding spell, four bleeding spells in June, six in July and again on Nov. 28. There was no rise in blood pressure, no toxic symptoms and urine was negative. Although due on Dec. 10 labor did not start until Dec. 27. Christmas day was the last time she felt the baby, which was stillborn and showed congenital varus of the right foot. The

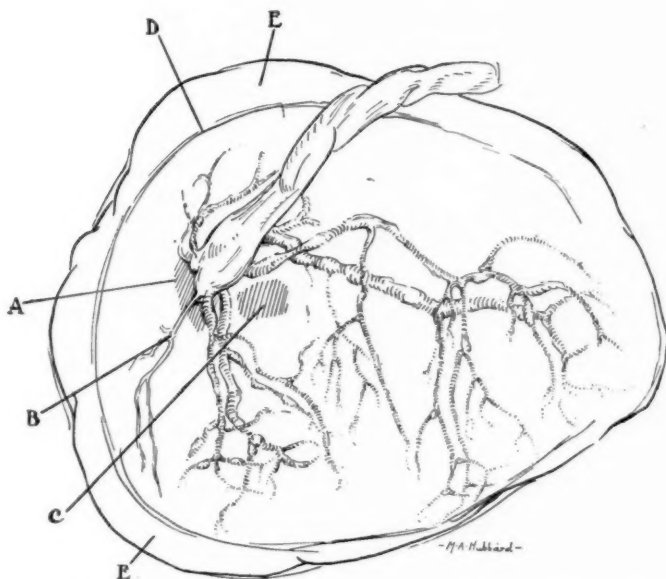


Fig. 5.—Case No. 011. Baby, congenital heart (single auricle) and ascites. A, white infarct at base of cord. (Note absence of active blood vessels.) B, empty blood vessel; C, white infarct on fetal surface; D, white line of damage; E, rim of placental tissue grown since damage D took place, and containing no surface blood vessels.

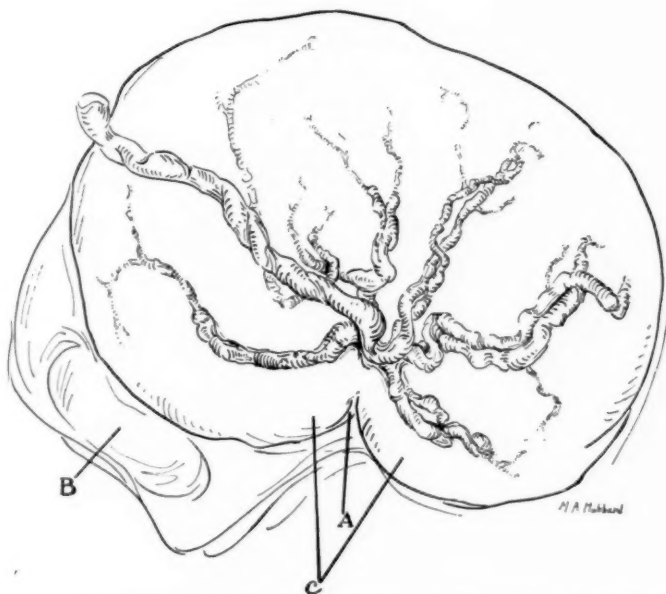


Fig. 6.—Case No. 575. Right congenital varus. A, indentation in edge of placenta near base of cord corresponding to bleeding spell of 44 days menstrual time; B, opening in membranes on edge of placenta; C, infarcted tissue.

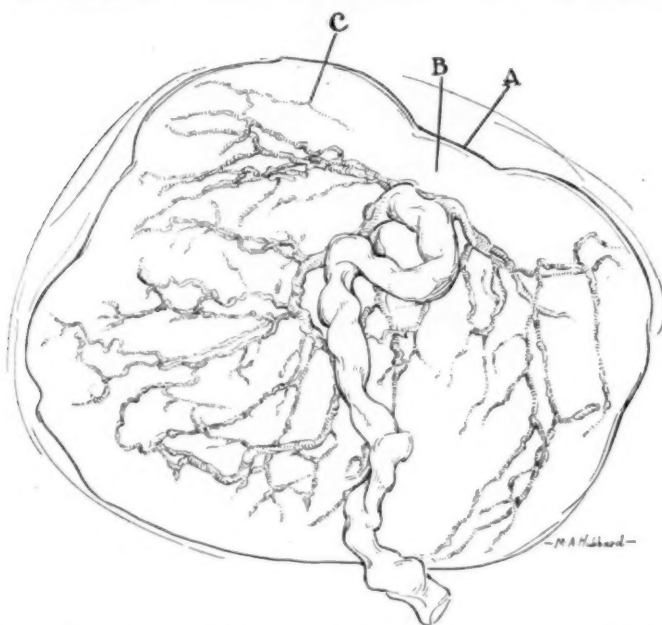


Fig. 7.—Case No. 013. Baby anencephalic. *A*, edge of placenta $\frac{3}{4}$ inch from base of cord; *B*, area of placental tissue with no blood vessels on fetal surface and firmer in consistency than the rest of placenta; *C*, small filled blood vessel which dips beneath fetal surface to reach cord.

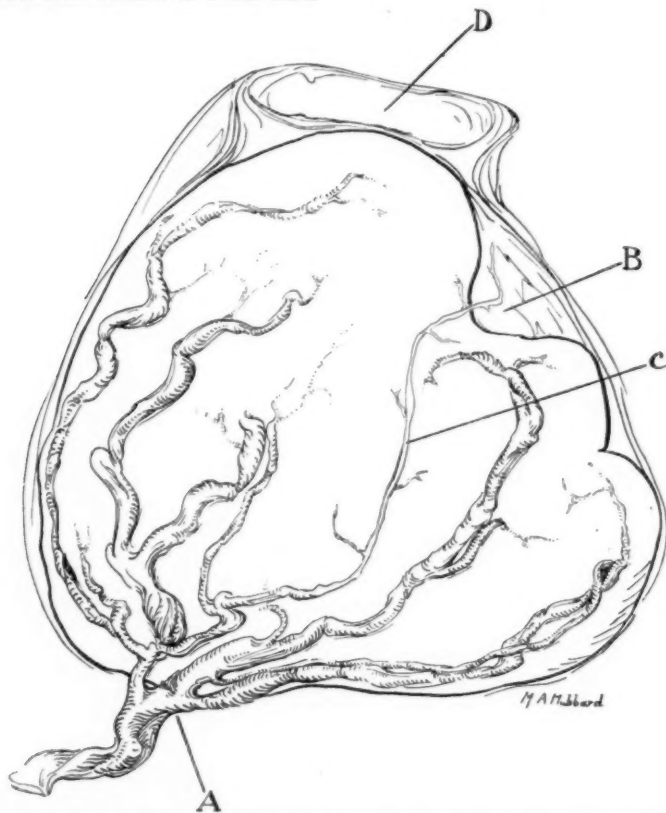


Fig. 8.—Case No. 014. Asymmetry of cerebral hemispheres. *A*, cord attached to edge of placenta; *B*, large white infarct corresponding to bleeding spell six weeks before birth; *C*, empty blood vessel; *D*, opening in membranes on edge of placenta.

placenta showed an area of damage at the base of the cord. It will be noted in the drawing that the opening in the membranes was on the edge of the placenta and probably this accounts for the repeated bleeding spells in June, July and November. There was also a white infarct on the maternal surface near the base of the cord. (Fig. 6.)

CASE 013. Multipara. Reported by the courtesy of Drs. Melick and Herrick. No history available in this case except that the patient had had a blood pressure of 140 for over two years previous to her present pregnancy. The baby was anenceph-

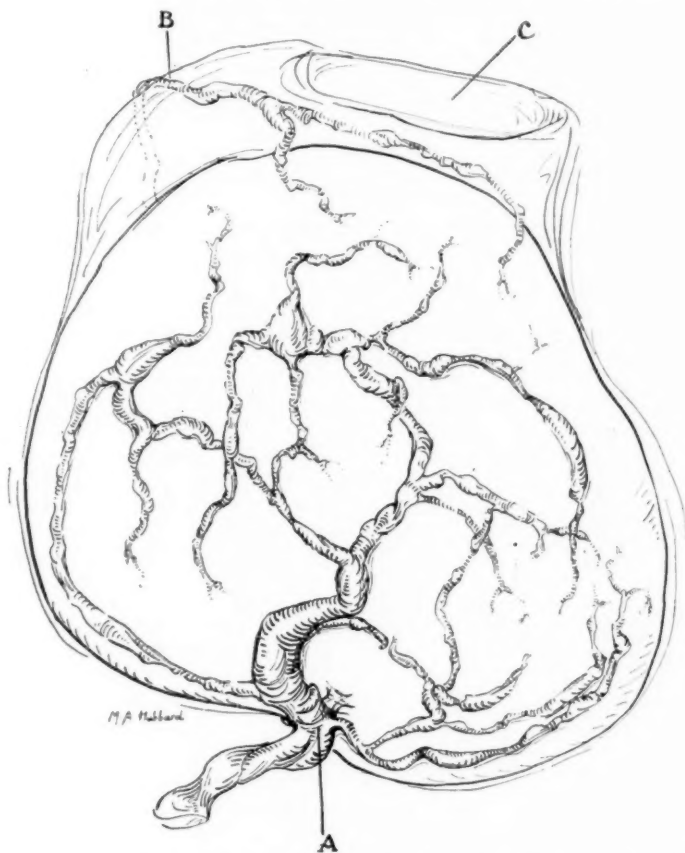


Fig. 9.—Case No. 591. Deformity of both hands and duodenum. A, cord attached to edge of placenta; B, blood vessel which traversed the membranes opposite to the placenta until it reached placental tissue; C, opening in membranes near edge of placenta.

alic and stillborn at seven months. The placenta showed the cord attached near the edge with damaged placental tissue between the cord and the near edge. (Fig. 7.)

CASE 014. Primipara, age twenty-five. Last period June 8, 1922. In August she had an infected painful tooth treated. She flowed a little Oct. 15, also for two days following Jan. 5. Teeth: four crowns, one pivot tooth, two retained roots with pyorrhea. Tonsils, small. There was bleeding during labor. Breech delivery on Feb. 28, was complicated by dry uterus and a firm contraction ring. Baby was stillborn. The left side of the head was larger than the right. Autopsy was done,

and although no other deformities were found, the left hemisphere after removal from the skull was definitely larger than the right. The cord had almost a velamentous attachment to the edge of the placenta. Note the opening in the membranes on the edge of the placenta opposite the cord attachment. Also the white infarct which agrees in position to the time of the bleeding on Jan. 5. (Fig. 8.)

CASE 591. Multipara, age thirty-one. First seen at end of seventh month. First pregnancy normal. Second, miscarriage at two months, one and a half years ago. Scarlet fever as a child. She had two crowns, with pyorrhea and two other dead teeth. X-ray examination showed three of these had apical abscess areas. Tonsils deep red and full of deposit. Last period was July 4. She could remember nothing abnormal about the beginning of her pregnancy, except neuralgia in the teeth. Vomited through the fifth month. Membranes ruptured on Mar. 17 with the escape of an excessive amount of fluid. Normal delivery followed. The thumb and first two fingers were absent on the right hand and there was a rudimentary thumb on

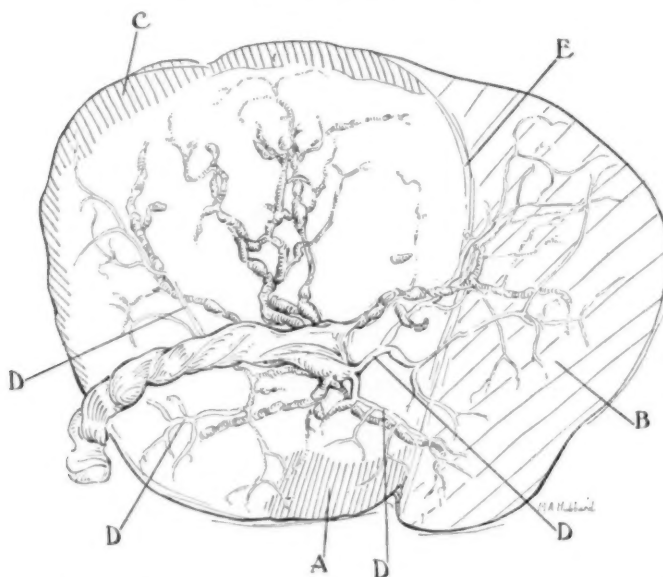


Fig. 10.—Case No. 611. Lumbar spina bifida. A, large white infarct; B, shaded area represents very thin placental tissue, much infarcted; C, infarcted edge of placenta; D, empty blood vessels; E, margin of normal placental tissue.

the left hand. Both hands were in acute flexion on the wrists. The baby died on the third day with symptoms of internal hemorrhagic disease. No meconium passed. Autopsy showed that the duodenum was much distended and did not connect with the jejunum. There was also evidence of hemorrhagic disease. The placenta had the cord attached to the edge and the tissue under the base of the cord was thin and firm. Note also the opening in the membranes on the edge of the placenta opposite to the cord attachment. (Fig. 9.)

CASE 603. Multipara. First pregnancy; Baby died, hemorrhagic disease; Second pregnancy, a miscarriage; Third pregnancy, normal.

Between the third and fourth pregnancies the patient had been troubled with sore throat. The left tonsil was full of retained deposit. Last period was July 10, 1922. On April 15, 1923 she had a normal breech delivery. The placenta showed the cord attached to the edge. The baby seemed normal. The patient was asked whether she could remember any colds in the early part of her pregnancy and

reported that her last period was July 10 and on the 29 she had a severe cold. On the third day of the puerperium the nurse reported that the baby had an abdominal hernia. The ring of the hernia was found about one inch above the umbilicus and in the median line, and about the size of a lead pencil. The hernia was still present but not increasing in size when the child was three months old. In this case the evidence was obtained in the reverse order. In asking the patient for evidence of acute infection early in pregnancy, I was searching for evidence to account for the position of the cord attachment on the placenta. The small congenital defect in the baby was not discovered until the other evidence had been obtained.

CASE 611. Primipara, measles, scarlet fever, severe chicken pox, influenza 1918, tonsillectomy, 1917. Has been subject to neuralgia of the back of the neck and right arm since tonsillectomy. Has two dead teeth, one of which shows inflamed gums. Last period July 15. Life felt Nov. 23. Delivered May 7 by low forceps of a poorly nourished baby with lumbar spina bifida, very wide fontanelles and sutures and a spastic right leg. Baby died in ten days. Autopsy showed death due to hemorrhagic disease. The pregnancy had been mildly toxic, beginning with excessive vomiting requiring hospital treatment. Blood pressure was 140-95 before delivery, urine negative. There was a small bleeding spell one week before delivery. A sketch of the placenta shows damage to the placental tissue within one and one-half inches of the base of the cord and an infarcted edge on the most distal portion of the placenta. (Fig. 10.) There is no clinical event in this pregnancy other than the severe vomiting which occurred the first week in Sept. or about the time when the damage on the placenta originated.

CASE 015. Multipara, age thirty-one. Past history unessential except that she had been subject to colds. Four previous deliveries were said to be normal.

The last period of her fifth pregnancy occurred Dec. 18, 1922, and she had a normal delivery on Oct. 4, 1923. The head of the baby was deformed. The frontal prominences were depressed with the result that the frontal suture formed a sharp protruding ridge. The eyes were slanting downward and inward.

Her pregnancy had been slightly toxic, vomiting lasting through the sixth month, headaches occurred daily during September and there was moderate edema. On Feb. 1 she went to bed with a severe cold and remained there five days. The placenta showed the cord attached three-fourths of an inch from the edge.

The outstanding feature in these twenty cases is the fact that all the placentas show evidence of damage within a radius of an inch and a half from the base of the cord. The evidence from other cases tends to show that the bleeding spells which occur within the first two months of pregnancy are associated with placentas which have the cord attached one and one-half inches or less from the edge of the placenta. This evidence is also consistent with the size of the placenta at this early stage in pregnancy.

From a clinical standpoint in seven of the cases there is the association of an acute infection in the head (a cold) within the first two months of the pregnancy, four others had a bleeding spell within the first two months of pregnancy, eight of the remaining nine were associated with foci of chronic infection and one case has no history or examination but had a raised blood pressure.

The different types of deformity are as follows: anencephalia, six; hare-lip, absence of right ear, asymmetry of hemispheres, deformity

of frontal bones, deformity of heart with ascites, deformity of esophagus, hernia of abdominal wall, deformity of both hands and duodenum, one each; lumbar spina bifida and congenital valgus, each two; congenital varus and deformity of both feet, one each.

It was my original conception that the deformed baby was the result of direct infection of the embryo through the villous membrane. The work of Stockard⁹ of Cornell, however, shows that direct infection of the embryo is not necessary. He has produced twins, double monsters and deformities in fish by reducing the oxygen supply to the eggs at a crucial time in their development. In view of this work it is more probable that the injury to the placenta and the placental site caused by the beginning infarct (the hemorrhagic lesion with thrombosis above referred to) reduces the total area for oxygen interchanged between the mother's blood and the fetal blood. It is reasonable to assume that such an injury will cause a temporary cyanosis in the embryo. If this accident happens at the time that some part of the embryo is in the process of rapid proliferation or budding, such a part will be inhibited in its growth with the result that a failure of development of that part takes place. Stockard has shown that there are periods of relative rest between these budding processes. It is apparent, therefore, that there may be an injury to the placenta early in the pregnancy but if this injury does not cause sufficient cyanosis in the embryo or does not occur at the time some budding process is active, no damage to the embryo will result. This feature of the situation makes it clear why a placenta with an injury at the base of the cord does not always bring a deformed baby in association with it.

A very interesting case which tends to support Stockard's theory was reported by Dr. Davis of Omaha.¹⁰ In his case of homologous twins, both had identical types of hare-lip. By good fortune he had noted in his report that both cords came from the edge of the placenta. This case shows contemporaneous damage to both embryos and contemporaneous damage near the base of both cords.

The observation which Dr. Greenhill of Chicago¹¹ has recently published, calling attention to the frequent association of deformed babies with placenta previa, contains important confirmatory evidence. In an earlier paper¹² I have endeavored to show that early damage to the placental site may be the determining factor in causing some cases of placenta previa. For example, if the damage to the placental site is on the upper edge, the compensatory growth on the lower edge may reach the cervix even though the ovum had a relatively normal point of implantation in the uterus. Reference to the foregoing cases shows that four of them show this feature. This evidence is therefore in conformity with Dr. Greenhill's observations. The foregoing theory as to the cause of deformed babies shows that the same early

damage to the placental site may be at once the cause of the deformity and the cause of the previa. The reason that there is an increased incidence of deformed babies in association with placenta previa is therefore explained.

Further evidence which is consistent with the foregoing theory as to the origin of deformed babies is to be found in the chapter on the *Pathology of the Human Ovum* in the first volume of *Human Embryology* by Keibel and Mall. In this chapter he submits evidence which conclusively shows that a *normal* ovum may develop any deformity which may result from a lack of development of some part or parts of the embryo. This evidence tends to show that heredity is not always the dominant factor in deformities, if at all. He also states that most deformities have their origin before the end of the eighth week. The following quotations are significant on the question of the presence of inflammation and its site:

"The study of pathologic ova has shown that the embryos within are deformed and that there are structural changes in the chorion which appear to be associated with inflammatory processes in the uterus. The villi are usually fibrous or are otherwise degenerated, the syncytium is atrophic or necrotic and there is an excess of blood and mucus rich in leucocytes between the villi. The picture indicates that the chorion is affected by an inflamed uterus which naturally interferes with its nutrition."

The extremely discrete nature of the damage is shown by the following statement and a suggestion of the infectious origin is given.

"The chorion shows all kinds of changes of its syncytium. It is often deficient, irregular, or necrotic or intermixed with leucocytes which may form *small abscesses* in it." (The italics are mine).

These findings are similar to those found in the two cases above referred to where the placenta was examined *in situ*.

Mall also points out that fully 50 per cent of abortions contain malformed embryos and that 12 monsters abort to every one that goes to full term. In view of the evidence submitted I should interpret this association of abortion with the deformed embryo as being dependent on the death of the deformed embryo or a subsequent damage to the placenta rather than to the fact of the deformity of the embryo alone. By this theory it is plain that the same process which caused the deformity can cause miscarriage if it is repeated and is greater in extent.

CONCLUSIONS

The evidence tends to show that most congenital malformations which are the result of lack of embryonic development are not hereditary defects but acquired *in utero*; that defects in development are due to injury to the placenta during the early weeks of pregnancy; that the injury to the placenta is due to maternal hematogenous in-

fection of the blood vessels of the placental site, and that the source of the hematogenous infection is generally to be found in the teeth or tonsils.

28 PLEASANT STREET.

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END RESULTS OF 201 CASES OF CARCINOMA OF THE CERVIX

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THE following is a report of 201 consecutive cases of carcinoma of the cervix, admitted to the Gynecological Service of the Roosevelt Hospital, during the period from 1910 to 1920, inclusive,—eleven years. During this time there have been a number of changes in the procedure of handling these cases and, since 1917, radium has been used extensively in the great majority of instances, either alone, or preparatory to and following operative removal. For this reason, a study of the end results is not complete without showing their relation to the type of procedure, and the groups shown in the tables which follow are so arranged as to bring out this relationship.

No attempt will be made to study these cases with reference to symptoms, signs, or other points of interest in their histories, except to give the age of incidence, state in life, and the relation to child-bearing. Likewise, the pathology will be discussed only as to type and location of growth, with special reference to its bearing on the end results, particularly in those cases which show no recurrence, after three years.

Age of Incidence.—The exact age is known in 182 cases, and an analysis by decades shows the following: Two cases between ten and twenty years, one being twelve and the other nineteen years of age; 7 cases between twenty and thirty; 36 cases between thirty and forty; 76 cases between forty and fifty; 53 cases between fifty and sixty; 5

cases between sixty and seventy and three cases over seventy,—these being seventy-one, seventy-two and seventy-five years of age. Thus it will be seen that 90 per cent of the cases fell between thirty and sixty years, and 70 per cent of the cases between forty and sixty years. The average age is forty-five and one-half, the youngest being twelve and the oldest seventy-five years. The age seems to bear little, if any, relationship to recurrence: for the average age of cases free from growth, after three years, is forty-one, which is practically the average age of incidence.

State in Life, and Relation to Child-Bearing.—Of the 201 cases, 192, or 95.5 per cent were married, while 9, or 4.5 per cent were unmarried. Likewise 181 cases, or 94.3 per cent bore one or more children, while 11, or 5.7 per cent were nulliparae. With such a preponderance of these cases falling among the multiparous women, one naturally is forced to the conclusion that child-bearing is a definite causative factor in carcinoma of the cervix; but when one considers that the majority of women at forty-five,—the average cancer age shown above,—are married and have borne one or more children, this conclusion loses some of its importance.

Pathology.—Of the cases included in this report, biopsy with pathologic report, from sections, was obtained in 192, while in 9 cases the diagnosis was only established clinically,—but in each of these latter the disease was so far advanced as to be practically unmistakable, and was grossly of the squamous variety. Of the specimens examined in the laboratory, 9, or 5 per cent proved to be adenocarcinoma, the remainder, 183, or 95 per cent, being squamous in character. All the cases which have shown no recurrence, after three years, were of the squamous group. As to the age and type of growth, the youngest case, 12 years, showed adenocarcinoma, while the ages of the other cases, in this group, all ranged between forty and fifty years.

A study of the location and extent of growth on admission furnishes several points of interest. These facts have been established, in all but the few classed as inoperable, by pelvic and rectal examination under a general anesthetic, and, in the cases where excision was done, by direct observance at operation and subsequent study in the laboratory. In only 48 cases the lesion was confined to the cervix alone; in 40, it had extended into the vaginal walls, while in 103 it was decided that the surrounding parametrial tissues were involved. Of the 16 cases alive over three years without recurrence, 11 showed cervical involvement only; four showed extension to the vaginal walls, and one case beginning extension into the parametrium. Of the cases in which recurrence took place after three years, all but one originally had involvement of cervical tissue only. Thus, in these cases traced, a favorable prognosis depended very materially on whether or not the growth was limited to the cervix.

Type of Procedure.—As stated previously, the type of procedure in handling these cases of carcinoma of the cervix has varied considerably from time to time during the eleven years covered by the report. Before the use of radium cases were divided into two groups,—the operable and the inoperable,—the latter being treated only palliatively, or with chemicals such as acetone. The operable group had either the classical Wertheim type of operation, or a complete hysterectomy, with rather wide excision of the broad ligaments; and both of these were, as a rule, combined with cauterization of the cervix. The latter was accomplished, in some cases by the actual, or hot, cautery, and in others by the Percy method. In an intermediate group of cases excision was not attempted, but the cervix alone was subjected to cauterization by one of the two methods mentioned above.

After the adoption of the use of radium in 1917, a number of cases were still treated by these procedures, but soon thereafter the present-day methods were developed as follows. Extremely early cases are still considered operable and receive radiation with the element both before and after excision. A varying period of from two to six weeks is allowed to elapse between the primary radiation and hysterectomy, and here a modified Wertheim, with exposure of the ureters in their lower course, or a rather wide complete hysterectomy is done. Postoperative radiation in the healed vaginal vault is begun before the patient leaves the hospital, and is continued later, if the original extent of the growth seems to warrant it. The average preoperative application of radium is 2400 milligram-hours within the cervical canal and growth,—while the average postoperative dose is 1000 milligram-hours. The element itself is used in silver and brass capsules,—one 50 and two 25 milligram tubes. At present the inoperable cases are treated by repeated radiation of the growth,—the primary application usually being 2400 milligram-hours;

TABLE I

OPERATION	TOTAL	TOTAL TRACED
Hysterectomy		
Wertheim-cautery	41	21
Wertheim-radium	10	9
Total Wertheim type	51	30
Hysterectomy		
Complete cautery	34	20
Complete radium	12	7
Total complete type	46	27
Total hysterectomies	97	57
Hot cautery alone	17	9
Percy cautery alone	10	8
Radium alone	50	15
Total operations	174	89
Inoperable (previous to 1917)	27	5
Total Cases	201	94

and those following depending upon subsequent examination, and the possibility of vesicovaginal and rectovaginal fistulae.

Table I shows the 201 cases grouped according to the type of operative procedure, as well as the number in each group which could be traced with sufficient accuracy as to be considered of value in establishing end results.

There were 97 hysterectomies, 51 of them Wertheim and 46 complete. Only 30 per cent of the former and 27 per cent of the latter could be traced. Seventeen cases were cauterized with actual or hot cautery only, while on ten the Percy method alone was used. We have been able to follow nine of the former and eight of the latter. Fifty cases received radiation only, of which the outcome is known in fifteen. The remaining 27 were of the inoperable, advanced group, and were seen previous to the use of radium.

End Results.—Of the 201 cases treated, only 94 could be traced, and the end results discussed below are based upon this total.

Operative Cases, with No Recurrence, or Free from Growth Three Years or more After Operation.—Sixteen cases fall into this group and are shown below in Table II. The only cases considered here, as possibilities, are those in which some type of hysterectomy was done; except for one case of Percy cauterization of the cervix and ligation of the internal iliaes, in which there was no evidence of growth four years after operation. This case has not been traced since 1920, and all attempts to locate it have been unsuccessful.

TABLE II
CASES WITH NO RECURRENCE IN RELATION TO OPERATIVE PROCEDURE

OPERATION	TOTAL TRACED	3 YEARS	4 YEARS	5 YEARS	6 YEARS	7 YEARS	8 YEARS	9 YEARS	TOTAL
Wertheim-cautery	21	1	1	1			1	1	5
Wertheim-radium	9			2	1				3
Total Wertheim	30	1	1	3	1		1	1	8
Complete cautery	20			1			1	1	3
Complete radium	7	1	1	1		1			4
Total complete	27	1	1	2		1	1	1	7
Total hysterectomies	57	2	2	5	1	1	2	2	15
*Percy cautery alone	8		1						1
Total	65	2	3	5	1	1	2	2	16
Percentage (Excision cases)	57	4.5	4.5	11.4	2.3	2.3	4.5	4.5	34.0

*This case had ligation of internal iliaes also.

Note: As 13 of these cases died postoperatively, percentages are figured on total of 44.

It will be seen that 2 cases have gone between three and four years without recurrence; 3 cases between four and five years; 5 cases between five and six years; 1 case between six and seven years; 1 between seven and eight years; 2 between eight and nine years, and 2 between nine and ten years. Eleven, or more than two-thirds, of these cases are

over five years. Thus, of the 57 cases traced, which had some type of hysterectomy, 15 are known to be alive without recurrence more than three years, or a total of 34 per cent for successful results in the operative cases. A correction of percentage is necessarily made as 13 of this group died postoperatively in the hospital.

The table also shows the type of operative procedure, and here the results indicate practically as much success, where complete hysterectomy was chosen, as where the more extensive Wertheim was done. If any operative group can be said to have shown more success than the others, it was where one of the two types of hysterectomy was combined with radiation. This fact would seem to justify the present method of treatment described above for operative cases, that is, wide complete hysterectomy, with preoperative and postoperative radiation.

Operative Cases with Known Recurrence.—Here again only cases in which some form of hysterectomy was done are considered, and they are summarized in Table III.

TABLE III
SHOWING TIME OF RECURRENCE IN RELATION TO OPERATIVE PROCEDURE

OPERATION	TOTAL TRACED	6 MONTHS	1 YEAR	18 MONTHS	2 YEARS	3 YEARS	4 YEARS	5 YEARS	TOTAL
Wertheim-cautery	21	3	2		1	3	1		10
Wertheim-radium	9	2	2		2				6
Total Wertheim	30	5	4	0	3	3	1	0	16
Complete cautery	20	3	3	1			1	2	10
Complete radium	7	1		1		1			3
Total complete	27	4	3	2	0	1	1	2	13
Total hysterectomies	57	9	7	2	3	4	2	2	29
Percentages of total	44.	20.5	15.9	4.5	6.8	9.1	4.5	4.5	65.9
Percentages of re- currences		31.0	24.0	7.0	10.0	14.0	7.0	7.0	

Note: Recurred in 3 years, 25 (85 per cent); over 3 years 4 (14 per cent). Percentages are figured on a total of 44.

All these showed recurrence within the pelvis,—the majority in the remaining parametrial tissues; a few locally in the vaginal walls, and only one to some distant organ,—in this case to the parotid gland. Nine cases had recurrence in six months, seven more in twelve months, two more in eighteen months, three between eighteen months and 2 years; four more in three years; two more in four years, and two more in five years. Thus, of the 57 operative cases traced, 29, or 66 per cent are known to have had recurrence, and of these 55 per cent recurred within one year, 86 per cent within three years, 14 per cent between three and five years, and no cases going over five years have shown recurrence to date.

This table also shows the type of operation in relation to time of recurrence,—but little if any conclusion can be drawn from this compari-

son. Sixteen cases had had Wertheim and thirteen complete hysterectomy. Up to three years, fifteen of the former and ten of the latter had shown recurrence, while after three years one Wertheim and three complete hysterectomies developed further lesions. Comparison of these figures with the total cases traced for each operative group, shows approximately a 50 per cent recurrence in each.

Deaths.—Table IV gives a statistical study of all deaths, showing the relation between the time of death and the type of treatment, whether excision, cautery or radium alone.

TABLE IV
SHOWING TIME OF DEATH IN RELATION TO OPERATIVE PROCEDURE

OPERATION	TOTAL TRACED	P.O.	6 MOS.	1 YR.	18 MOS.	2 YRS.	3 YRS.	4 YRS.	6 YRS.	TOTAL
Wertheim-cautery	21	6	3	2			2	2	1	10
Wertheim-radium	9		1	2	1		1		1	6
Total Wertheim	30	6	4	4	1	0	3	2	2	16
Complete cautery	20	7	2	1	2	1		2	1	9
Complete radium	7			1		1	1			3
Total complete	27	7	2	2	2	2	1	2	1	12
Total hysterectomies	57	13	6	6	3	2	4	4	3	28
Percentages	44	13.3	13.6	13.6	6.8	4.5	9.0	9.0	6.8	63.6
Hot cautery alone	9		4	1	1	2		1		9
Percy " "	8		4	2		1				7
Total cautery	17		8	3	1	3	0	1	0	16
Radium alone	15		6	2	2	2	2	0	0	14
Total	89	13	20	11	6	7	6	5	3	58
Percentages	76	7.5	26.3	14.5	7.9	9.2	7.9	6.6	3.9	76.3

Note: Of the 27 inoperable cases treated palliatively, only 5 could be traced, and all died within 6 months.

Of the 57 cases which had hysterectomy, thirteen died postoperatively in the hospital and are analyzed as a special group below; six died within 6 months, six more within a year, five more in two years, eight more in four years, and three more in six years. The last three had shown recurrence in two, three and five years, respectively, but life was prolonged until the sixth year in each case by radiation. Thus of the 57 cases mentioned above 44 left the hospital, and of these 28, or 63 per cent died of cancer within six years,—21 or 75 per cent of the deaths occurring within three years. One additional case, free from growth four years after operation, died of pneumonia. One other patient, developing recurrence five years after excision, is still living two years after the recurrence was noted, but is in very poor health. Of the cases leaving the hospital, approximately just as many died of cancer following Wertheim as following complete hysterectomy.

Seventeen cases were traced which had been treated with the hot and

Percy cautery. Of these all but one were dead within three years, and 70 per cent of these deaths occurred within one year.

Only fifteen cases treated by radium alone could be traced, and of these fourteen were dead within three years,—60 per cent of these deaths occurring within the first year. The remaining case is still alive, three years after first radiation, but the growth is well advanced and the patient has a rectovaginal fistula.

Of the twenty-seven advanced inoperable cases that received nothing but palliative treatment, only five could be traced, and all of these died within six months.

Thus a summarization shows a grand total of 76 (or 80 per cent) deaths due to cancer, out of the 94 cases traced.

Postoperative Deaths.—An analysis of the thirteen cases dying in the hospital, after operation, follows:

From 1911 to 1920, there were 97 hysterectomies, 51 of Wertheim and 46 of the complete type. Thirteen of these cases, or 13.3 per cent, died postoperatively in the hospital. All of these deaths occurred between 1911 and 1915, during which period 64 of the hysterectomies were done. From 1916 to the end of 1920, 33 cases had hysterectomy (17 Wertheim and 16 complete) but in none of these did death result from operation. Of the seventeen cases treated by the hot cautery and ten by Percy cautery, none have died in the hospital. Likewise, there have been no fatal results from treatment by radium, either alone or combined with hysterectomy, there having been fifty of the former and twenty of the latter, in the period covered by the report. Thus, of the 174 cases having some type of operative procedure, in 13 only (or 7.5 per cent) can it be said that death resulted from operation.

In these postoperative deaths, the average age of the patient was forty-eight. One case died on the table, and six others died within seventy-two hours; two died from pneumonia (one on the fourth and the other on the fourteenth day); one death on the eighth day was due to ileus; and in three other cases (one on the eighth, one on the eleventh and one on the eighteenth day) death resulted from circulatory com-

TABLE V
SHOWING RELATION OF DEATH TO RECURRENCE

RECURRENCE IN	TOTAL	DIED AFTER RECURRENCE IN					
		6 MONTHS	1 YEAR	18 MONTHS	2 YEARS	3 YEARS	4 YEARS
6 months	9	6	1	2			
1 year	7	5	1			1	
18 months	2	1	1				
2 years	3		2				1
3 years	4	2	1			1	
4 years	2	2					
5 years	2		1		(1-alive)		
Total	29	16	7	2	1	2	1

plication. Six had had Wertheim and seven the complete type of operation. In four the growth was confined to the cervix; in three the vaginal walls were also involved, while in six there was beginning extension to the parametrium.

Relation of Death to Recurrence.—In Table V, the relation of time of death to recurrence is shown. Of the 29 cases, showing recurrence at various periods from six months to five years, 16, or 55 per cent, were dead six months later, while 7, or 24 per cent lived only one year, making a total of 23, or 79 per cent, who died within twelve months. Thus the length of time between operation and recurrence has no relation to, or effect upon, the time of death after recurrence; as the cases where carcinoma reappeared three, four and five years after operation, died just as soon as those in which the postoperative free interval was of much shorter duration. Two patients died three years, and one four years after recurrence, while one is still alive, four years after the growth reappeared. But all four of these cases have been extensively radiated,—this accounting in some measure for the prolongation of life.

Radium Cases.—Since 1917, seventy-two cases have been treated by radiation, either alone or combined with some type of excision. Fifty cases, having been considered inoperable, have had radium only, while twenty-two were radiated in conjunction with hysterectomy. Wertheim was done in ten, and complete hysterectomy in twelve of these twenty-two cases. Eight of them received radiation before, four after, and ten before and after operation. The average amount before was 2000 milligram-hours, and the average postoperative application was 1000 milligram-hours. In the group of fifty cases treated by radium alone, the smallest total amount used was 1200 milligram-hours (this case failing to return for further treatment), while the largest amount was 7200 milligram-hours, in four applications. The average total application was 4000 milligram-hours.

Of the twenty-two operative-radium cases only sixteen could be traced. Of these seven, or 44 per cent have remained without recurrence—one three years, one four years, three five years, one six years, and one seven years. The remaining nine, or 56 per cent have all developed recurrence,—three in six months, two in one year, one in eighteen months, two in two years, and one in three years. Of these nine, all are dead,—six dying within six months, two within twelve months, and one, four years after the recurrence.

The latter case is of particular interest. Six years ago the patient had a Wertheim hysterectomy, with 2400 mghr. radiation before, and 600 mghr. after operation. Two years later recurrence developed as a small nodule in the anterior vaginal wall near the urethra. In the past four years since its reappearance the growth has been radiated three times for an additional 2150 mghr., the last application having been about one year ago. Within the past six months an indurated, ulcerated area

developed on the anterior vaginal wall, and metastatic masses have been noted within the pelvis. The patient's death has been reported within the past few weeks. Undoubtedly radiation very materially prolonged life in this case.

Of the fifty cases of advanced carcinoma of the cervix treated with radium alone, unfortunately only fifteen have been traced. This is due to the fact that the majority of them were treated during the recent war period (from 1917 to 1919), when the follow-up system was greatly handicapped by a limited personnel, and by the frequent change in the patient's address.

Fourteen, or 90 per cent of those traced have died of cancer, six within six months; two more within a year; two more in eighteen months; two more within two years, and two others lived three years. The remaining one, while still alive three years after the first radiation, is in fair health, but has a rectovaginal fistula, and the growth is well out into the parametrial tissues. This case has had 5200 mghr. radiation, in four applications. Two others had fistulae,—one rectovaginal and one vesicovaginal.

Thus 60 per cent of these advanced cases died within twelve months, and of the others only one had lived more than three years. All showed marked regression of the growth locally within the cervix and vaginal walls, the majority shrinking down so that their offensive discharge and bleeding were completely controlled. In many the lower parametrial involvement also showed some recession, and their general health was materially benefited for a time. Further spread of the growth outward, usually marked by deep pelvic and sciatic pains, could only temporarily be controlled, for at this stage additional radiation was usually limited by the danger of vesicovaginal and rectovaginal fistula. At present these cases are also receiving cross-fire x-radiation of the pelvis, in addition to radiation within the cervix, so that future reports will undoubtedly show even better control of the parametrial involvement.

SUMMARIES

Total number of cases	201	
Inoperable palliative	27	
Total operative cases	174	
Total hysterectomies (Wertheim 51)	97	
Total cauterly cases	27	
Total radium cases	50	
Total cases traced (Inoperable-5)	94	
No recurrence or free from growth	16	34%
Recurrence, but not dead	1	2%
Died, postoperative	13	7%
Recurrence, and dead	28	63%
Recurrence in less than three years	25	57%
Recurrence after three years	4	9%
Alive three years, without hysterectomy	2	6%
(Radium cases—1; Cautery, 1.)		
Dead, without hysterectomy	30	94%
Total dead in less than three years,	68	72%
Total dead after three years	8	9%

In the past three years, 1921 to 1923, an additional group of 46 cases of carcinoma of the cervix have been treated. Thirty-one were of the advanced type and had radium alone, while fifteen were considered sufficiently early to have hysterectomy after radiation. These end results are not included in this report, as the usual three year period has not elapsed, but the percentage of those free from growth to date is most promising, and should be even higher than the figures given above for the preceding ten years.

CONCLUSIONS

1. *Advanced Cases.*—This group, when treated by radium alone shows much better results than were formerly obtained by any other nonoperative palliative procedure, or by such operative measures as the use of the actual or Percy cautery. The growth locally in the cervix and vaginal walls can be controlled, so that the patient is infinitely more comfortable than formerly: and the parametrial involvement can for a long period be held in abeyance,—especially if radiation is combined with external x-radiation. Treatment with radium in such cases is a safe procedure: for in none of the 81 cases radiated in the past seven years, has death resulted from its use.

2. *Early Cases.*—This group, when subjected to hysterectomy, shows 34 per cent free from growth three years or more after operation; 25 per cent free five years or more; and where hysterectomy was accompanied by radiation 44 per cent had no recurrence three years or more, and 31 per cent five years or more after the removal. These results compare very favorably with the figures reported by those clinics where radium is available in large amounts, and radiation alone is the adopted method of treatment. Thus, where radium can be used in limited amounts only,—such as 100 milligrams of the element,—and the method of application must necessarily be limited also, hysterectomy plus radiation is still the method of choice in early cases. Here too the safety of such procedure, from the standpoint of postoperative mortality must be emphasized. None of the thirty-seven cases of hysterectomy combined with radiation, have died as a result of operation.

As x-radiation will also be included hereafter in the operative procedure of this group, future end results should show an even higher percentage of five year cures.

THE PHENOLTETRACHLORPHTHALEIN TEST OF LIVER FUNCTION IN THE TOXEMIAS OF PREGNANCY

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THE work of Abel and Rowntree¹ in 1909, and that of Whipple, Mason and Peightal² in 1913, showed that phenoltetrachlorphtalein is nontoxic and that when it is injected intravenously it is removed from the blood entirely by the liver and is excreted in the bile. The possibility of using its rate of excretion as a measure of liver function was investigated by a number of workers, the method at first used consisting in determining the proportion of the injected dye which could be recovered in the stools.^{3, 4, 5, 6, 7} Later, attempts were made to use the amount recoverable in the bile or the time required for the appearance of the dye in the bile, the bile being obtained by means of a duodenal tube.^{8, 9, 10, 11, 12} While these methods were not entirely satisfactory and did not result in general adoption of the test, yet almost all of these investigators found that in cases of marked liver damage the dye was retained and most of them felt that the test gave some indication of liver function.

In 1922 Rosenthal^{13, 14, 15} modified the test by injecting intravenously a dose proportional to the body weight and determining, instead of the amount of dye excreted in the bile or stools, the amount remaining in the blood serum. With this method he showed that the necrosis of the liver produced in dogs by chloroform or phosphorus poisoning resulted in a marked delay in the excretion of the dye. He then applied the test to ten physically normal patients and ten patients with extra-hepatic disease, using a dose of five milligrams per kilogram of body weight. The rate of excretion was found to be rapid and fairly constant, all of the dye being removed from the blood in from 40 to 60 minutes. About fifteen cases of hepatic disease were then studied and showed various degrees of retention of the dye. In four cases which showed marked retention of the dye the presence of gross liver damage was proved, in one at operation, in three at autopsy. (Three cases of carcinoma, one of acute yellow atrophy).

Such a test of liver function is, of course open, at once to a fundamental and serious objection; namely, that at best it measures only the ability of the liver at the moment to remove phenoltetrachlorphtalein from the blood, and its value must be based on an assumption that the normal function of the liver runs parallel to its capacity to perform

this unusual task. This objection seems even more serious when we consider that the liver has at least four known distinct functions and undoubtedly plays a very complicated rôle in metabolism. Obviously the test will have to be tried on a large series of cases and in a great variety of conditions before we can be sure of its interpretation. However, should it eventually be found that the retention of the dye is reasonably good evidence of liver damage, the test might be of value in detecting early the necrosis of the liver which occurs in the toxemias of pregnancy. Rosenfield and Schneiders¹⁶ have already reported a series of tests in toxemias of pregnancy, showing that in some cases there was a definite retention of the dye. I have used the test now on 20 normal pregnant women and 44 patients with toxemia.

TECHNIC

The method employed is essentially that described by Rosenthal.¹⁵ The patient is given intravenously approximately 5 milligrams of phenoltetrachlorphtalein for every kilogram of body weight. The dye used is that furnished by Hynson, Westcott, and Dunning in ampules holding a little more than 2 c.c. This solution contains 50 milligrams of phenoltetrachlorphtalein per c.c. The dye is measured in a 30 c.c. Luer syringe and diluted in the syringe with 2 to 4 volumes of normal salt solution. It is injected into an arm vein through a system of tubing and a three-way stop cock arranged so that the syringe and tubing may be rinsed into the vein with normal salt solution drawn from a flask. (See Figure 1.) Fifteen minutes, one hour, and two hours after the injection from 5 c.c. to 8 c.c. of blood is withdrawn from the opposite arm, to avoid any possibility of contaminating the samples with dye from the tissues. Care is taken always to use for taking samples a needle which has not been used for injecting dye, since the dye is easily decolorized and needles may be contaminated with dye and the fact escape notice. The samples are allowed to stand one to two hours until the serum has separated and are then centrifuged at high speed. The resulting serum should show no trace of hemoglobin. The use of anti-coagulants and determination of the dye in the plasma saves time but results occasionally in slight hemolysis which makes it impossible to determine accurately the amount of dye present.

The amount of dye in these samples is determined by adding alkali and comparing the resulting color with standard solutions. A dose of 5 milligrams per kilogram of body weight would produce, provided none of the dye were removed, a concentration in the blood of approximately 10 milligrams per 100 c.c.¹⁵ A 100 per cent solution is therefore prepared by diluting 1 c.c. (50 mg.) of phenoltetrachlorphtalein to 500 c.c. From this solution dilutions are prepared representing 2 per cent, 4 per cent, 6 per cent, etc., up to 24 per cent, sodium hydroxide being added to the higher dilutions to insure maintenance of the color. These dilutions are sealed in small test tubes and have been kept for four months without appreciable variation. In determining the amount of dye present 0.2 c.c. of 5 per cent sodium hydroxide is added to 0.8 c.c. of the serum to be tested in a small test tube and the resulting color matched with the standards. To get similar colors a tube of unalkalinized serum is placed behind the tube of standard solution and a tube of clear water behind the unknown. I have found that the comparison is better made by artificial light. Above 4 per cent a difference of 2 per cent is very readily appreciated. Below 4 per cent comparisons are not so satisfactory. Below 2 per cent the readings have been recorded either as a trace or a very slight

trace. A trace has been arbitrarily charted at 1 per cent and a very slight trace at 0.5 per cent.

Using this method I have now done the test 100 times on 69 patients. Two patients had moderately severe chills following the injection but there were no other general reactions. Thrombosis of the injected vein was fairly frequent but discomfort from this was unusual. Only once did a patient object to a repetition of the test.

NORMAL CONTROLS

The test was done on 20 clinically normal pregnant women who were just starting in labor, were at term but not in labor, or were in the last month of their pregnancy. None of these patients subsequently showed any evidence of a toxemia.

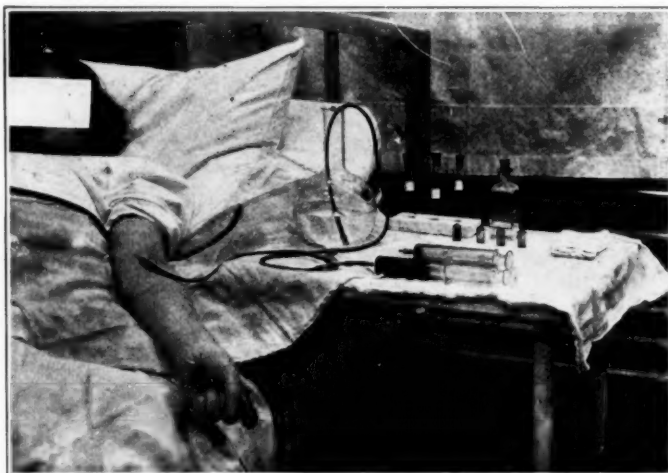


Fig. 1.—Photograph of patient being given the dye.

Fig. 2 shows all the varieties of curves found in these control cases. At the end of 15 minutes the amount of phenoltetrachlorophthalein in the blood varied from a trace to 7 per cent, but was usually between 3 per cent and 6 per cent. Only four cases showed more than a trace at the end of an hour, and only one case showed any dye present at the end of two hours, and then only a very slight trace. Of the four patients who showed from 3 per cent to 5 per cent at the end of an hour all have been delivered and none showed any evidence of toxemia. On one of the patients whose blood showed 5 per cent of dye at the end of 15 minutes, and the same amount at the end of an hour, the test was repeated a few weeks after delivery. Her blood then showed 5 per cent at the end of 15 minutes but only a very slight trace at the end of an hour. In all of Rosenthal's controls the dye was practically entirely gone in 40 to 60 minutes. It would seem therefore that occasional

slight degrees of retention are to be expected in clinically normal pregnant women as compared with normal nonpregnant patients.

Fig. 3 shows a composite curve of the normal controls and may be regarded as the typical normal curve of excretion. The dotted line in Fig. 3 represents what I have chosen to regard as the upper limit of normal retention of the dye.

THE TEST IN PATIENTS WITH TOXEMIA

The test has been used in forty-four patients. Cases of eclampsia have been included with these cases of toxemia, and no attempt will be

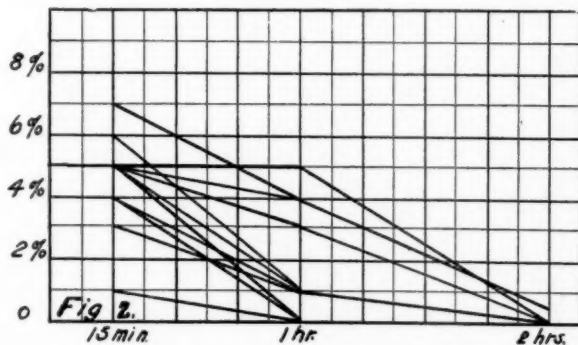


Fig. 2.—Varieties of curves obtained in 20 normal pregnant cases.

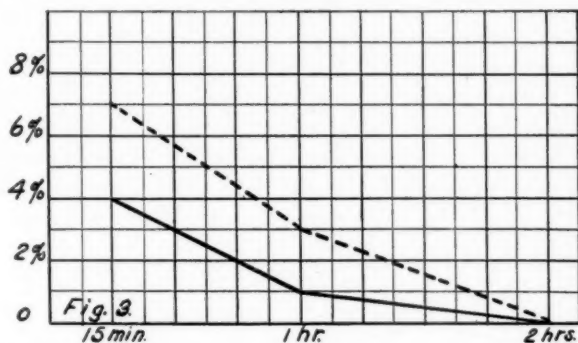


Fig. 3.—The heavy line represents a composite of the curves obtained in 20 normal pregnant cases. The dotted line represents the limit of normal.

made to distinguish here between the so-called nephritic and the pre-eclamptic types of toxemia, since with the data at hand this differentiation seems too uncertain. Cases of definite chronic nephritis are also included in the group but where chronic nephritis has been diagnosed or suspected the fact is noted.

Fig. 4 shows the variety of curves obtained in 10 patients, all of whom had a systolic blood pressure of 160 or higher and showed some degree of albuminuria. Curves 5, 1 and 21 are well within normal limits. Curve 17 is on the border line. Of the other distinctly abnormal curves

there are two types, one, e. g., Curve 24, which shows a rapid drop in the percentage of dye in the blood, but percentages which are well above normal for the time that has elapsed since the injection; and another, e. g., Curve 38, which shows retention of a small but nearly constant amount of dye for the whole two-hour period. The latter type probably should be considered abnormal, even though the dye remains at as low a level as 5 per cent or 6 per cent because in every such case in which it has been possible to repeat the test after delivery, a curve has been obtained similar to the normal one illustrated in Fig. 3. Curve 2 (Fig. 4) illustrates the result of the test in a severe eclamptic a few hours before death. The apparent increase of dye found in the blood

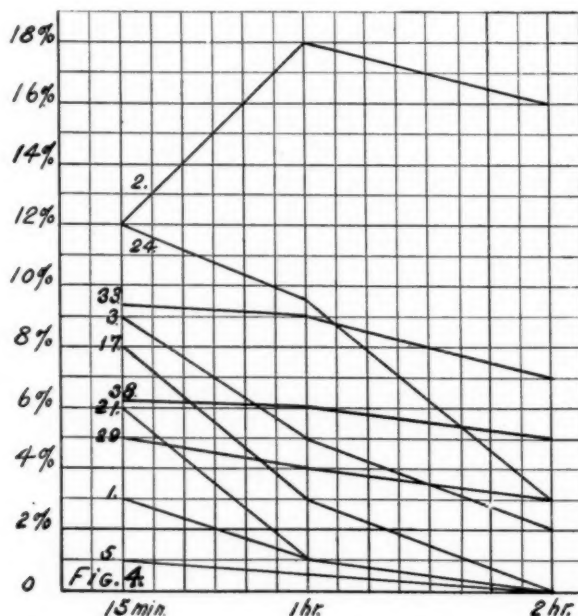


Fig. 4.—Varieties of curves obtained in ten cases of toxemia of pregnancy. All showed marked hypertension and some degree of albuminuria. Numbers refer to cases.

at the end of an hour was observed by Rosenthal¹⁵ in cases with very marked retention. An adequate explanation is not readily suggested.

In the treatment of these forty-four patients no attention was paid to the result of the liver function test. Therefore, in order to bring out any possible significance of the test I have divided the cases into two groups according to whether the test was or was not abnormal. Of the 44 patients 24 had normal tests and 20 had abnormal tests.

Table I is composed of the cases whose liver function tests were normal. (Cases 17 and 40 should perhaps be considered as showing slightly abnormal retention of the dye.) Of these 24 cases, 18 had blood pressures above 165, the other 6 had blood pressures between 140 and 165. About half of them show a trace or a large trace of albumen in the

TABLE I
CASES SHOWING A NORMAL LIVER FUNCTION TEST. LABOR OCCURRED SPONTANEOUSLY UNLESS OTHERWISE STATED

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.			TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
1	I	7th	185	L.T.	Severe headache and blurring of vision	3	Trace	0	1-day before	Voorhees' bag. Normal delivery	Well
4	II	3rd	150	s.t.	Headache	3	Trace	0	6 months before	Abdominal cesarean section	Obstetrically well
		8th	150-180	s.t.	Headache	3	Trace	0	7 weeks before		Chronic nephritis
		9th	180	s.t.	Headache	3	Trace	0	1-day before	(not in labor)	
5	I	Term	180-190	s.p.t.	None	1	Trace	0	3 days before	Low forceps	Well
8	III	7th	170	L.T.	Headache, stupor, edema, one convulsion	4	3	2	4 days before	Voorhees' bag. Normal delivery	Well
9	I	8th	150-160	T.	None	7	3	0	37 days before	Normal	Well
12	II	7th	170	s.p.t.	None	3	0	0	47 days before	Normal	Well
13	VI	Term	160-170	s.t.	None	3	Trace	0	1-day before		
		6th	180	v.s.t.	Edema. No other symptoms	5	0	0	40 days before	Miscarried macerated fetus in 7th month	Obstetrically well Chronic nephritis
15	I	8th	170-180	s.t.	Occasional slight headache	5	2	0	10 days before	Voorhees' bag. Normal delivery	Well
16	V	4th	200	s.p.t.	Headache, blurring of vision, vomiting	5	Trace	0	1 day before	Delivered herself of hydramnios	Obstetrically well Probable chronic nephritis
17	I	8th	170-180	T.	Severe headache	(a) 8 (b) 5	3	0	12 days before 14 weeks after del.	Low forceps	Well

*In this column, s.p.t. means slightest possible trace; v.s.t., very slight trace; s.t., slight trace; T, trace; L.T., large trace.
†In this column 1- means less than 24 hours.

TABLE I—CONT'D

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.			TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
18	IV	8th	170	s.t.	Epigastric pain. No other symptoms	7	2	0	1 day before	Voorhees' bag. Normal delivery	Well
19	VIII	Term	180	s.p.t.	Headache, blurring of vision	5	Trace	0	1 day before	Normal	Obstetrically well chronic nephritis
21	I	5th	220	s.t.	Headache, edema, blurring of vision.	6	Trace	0	2 days before	Miscarried	Obstetrically well chronic nephritis
22	I	9th	140	T.	None	4	Trace	0	9 days before	Normal. Twins.	Well
25	II	7th	180	0	None	2	0	0	10 days before	Premature labor Normal	Well
28	I	Term	130-200	L.T.	Convulsions 12 hrs. after delivery	4	2	0	24 hours after delivery	Normal	Well
31	III	Near term	240	T.	Headache, slight edema	7	Trace	0	1 day before	Voorhees' bag. Normal delivery.	Well
35	I	Term	165	s.t.	None	6	-	Trace	2-3 hrs. after del. when B.P. was found high.	Normal	Well

*In this column, s.p.t. means slightest possible trace; v.s.t., very slight trace; s.t., slight trace; T, trace; L.T., large trace.

†In this column 1- means less than 24 hours.

TABLE I—Cont'n

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.	TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
37	VI	6th	200	L.T.	Epigastric pain. One convulsion	6	Trace 1-day before	Vaginal Hysterotomy	Died 24 hrs. after operation. Liver showed microscopically very slight peripheral hemorrhages, and very slight central necrosis.
39	I	8th	150	T.	None	6	Trace 2 days before	Voorhees' bag. Mid-forceps	Well
40	II	8th	150 155	s.t. s.t.	None None	5 8	Trace 0 0 3 weeks before 4 days before	Started in labor Cesarean section (Preventious cesarean)	Well
41	IV	7th	180	T.	Slight headache	6	Trace 2 days before	Premature labor Normal delivery	Obstetrically well Probable chronic nephritis
42	XVII	6th	200	s.t.	None	5	Trace 0 2 days before	Vaginal hysterotomy	Well
43	II	Term	150	T.	None	6	Trace 0 8 days before	Started in labor by castor oil. Low forceps. Macerated fetus.	Well

*In this column, s.p.t. means slightest possible trace; v.s.t., very slight trace; s.t., slight trace; T, trace; L.T., large trace.

†In this column 1—means less than 24 hours.

urine, the other half a slight trace or none at all. In nine of these cases pregnancy was terminated, (in 6 by bagging, in 2 by vaginal cesarean section, and in 1 by abdominal cesarean section). Of the other 15 cases, one started in labor prematurely, two, who were nephritics miscarried and, the others started in labor spontaneously at or near term. The time elapsed between the test and delivery varied from less than twenty-four hours to about fifty days.

Two of these cases had convulsions and one of these two died. One (case 28) had five convulsions starting about twelve hours after delivery when her blood pressure was below 150. The liver function test was done about twenty-four hours after delivery (twelve hours after the convulsions had ceased) and it was normal. She recovered. The other (case 37) had one convulsion after she had been bagged and was then delivered by vaginal cesarean section. Twenty-four hours after delivery she died suddenly without having had any further convulsions. A complete autopsy was not obtained so that the exact cause of her death remains somewhat uncertain. A portion of her liver which was examined was normal on macroscopic examination but microscopic sections showed here and there at the periphery of lobules a few minute hemorrhages such as are characteristic of eclampsia, and also a few central necroses with hemorrhage.* In other words there was only very slight liver damage. The other cases recovered following delivery and except for those who had chronic nephritis were discharged well. Six of the eight patients who probably or certainly had chronic nephritis fall into this group with normal liver function tests.

Table II gives the facts in the 20 cases in which the test was abnormal. All but four showed a trace or a large trace of albumen. Headache, blurring of vision and epigastric pain were distinctly more common in this group. Five of the 20 patients had convulsions as compared with two of the 24 in the first group. In 9 cases labor occurred spontaneously, and in 10 pregnancy was terminated. One died undelivered. Six of the 20 patients died. One death was due primarily to streptococcus infection, the other five deaths were due primarily to the toxemia or the combination of toxemia and operative shock.

In four of the fatal cases in this group postmortem examination of the liver was possible. Three of these cases showed more or less marked necrosis of the liver. The fourth (case 44) in which death was due to streptococcus infection showed only a mild toxic degeneration with a very slight amount of central necrosis, although there had been a persistent fairly marked retention of the phenoltetrachlorphthalein.

Fig. 5 shows (a) a composite curve of the retention of dye in the fatal cases, (b) a composite curve of the retention in the 14 cases with

*Pathological examinations in all cases were done by Dept. of Pathology of Harvard Medical School.

TABLE II
CASES WITH DEFINITELY ABNORMAL LIVER FUNCTION TESTS. LABOR OCCURRED SPONTANEOUSLY UNLESS OTHERWISE STATED

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.			TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
						9 12 13 18	13 16	13 16			
2	VI	8th	180	L. T.	Admitted in convulsions				1-before del. 6 hours before death	Voorhees' bag. Low forceps	Died 72 hrs. after delivery in coma and jaundiced. Autopsy showed marked hemorrhagic necrosis of liver.
3	XIX	8th	230	L. T.	Severe headache, blurring of vision, moderate edema	9 4	5 0	2 0	1-day before 4 wks. after del.	Voorhees' bag. Version	Well
6	VI	Term	180	T.	Severe headache, vomiting, slight edema	10	9	6	Test done immediately after delivery	Admitted in labor, delivered normally	Well
7	IV	7th	160	L. T.	Epigastric pain (improved under treatment)	6	6	0	1 month before	Voorhees' bag. Normal delivery	Died about 3 hrs. after delivery apparently in shock. Liver showed peripheral hemorrhagic necrosis. (No complete autopsy)
		8th	188	L. T.	Epigastric pain Vomiting	9	8	Trace	1-day before		
10	I	6th	180	L. T.	Severe headache	5 6	5 2	3 0	2 days before 13 days after	Miscarried	Well
14	I	6th	200-230	T.	Blurring of vision, epigastric pain, slight edema	14	12	12	3 days before	Labor induced with bougie, normal delivery, macerated fetus	Well, † Chronic nephritis
20	V	Near term	220	L. T.	Very great edema. Headache, blurred vision, stupor. One convulsion	10	10	4	Few hrs. before death	Voorhees' bag.	Died undelivered. No autopsy

*In this column s.p.t. means slightest possible trace; s.t., slight trace; T, trace, and L.T., large trace.

†In this column 1- means less than 24 hours.

TABLE II—Cont'd

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.			TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
23	V	Term	180	L. T.	Moderate edema. Headache. No convulsions	9	8	7	1—before	Voorhees' bag. Version and extraction	Died immediately after delivery, presumably chiefly of shock; no autopsy
24	I	Term	150-220	L. T.	Convulsions 4 hours after delivery. No symptoms before except moderate edema	12	9	3	Test done 4 hrs. after delivery when convulsions started 15 days after delivery	Breech extraction	Well
26	II	Term	160	L. T.	Severe headache	5	5	2	1 day before	Normal delivery	Well
29	I	Term	160	T.	Slight edema	4	4	3	1—before	Normal delivery	Well
32	I	Term	240	L. T.	Slight headache. Moderate edema	11	9	5	2 days before	Twins (1) low forceps (2) Version	Well
33	I	9th	160	s. t.	Slight edema	9	9	7	1—before	Low forceps	Obstetrically well (Cardiac. No heart failure)
34	I	8th	160	L. T.	Marked edema, drowsiness. Marked elevation of N.P.N. Uremia	6	4	Trace	2 days before	Vaginal hysterotomy	Died about 60 hours after delivery. Autopsy showed extensive liver necrosis and very severe acute tubular nephritis
36	I	8th	150 175 130-150	T. — —	Slight edema No further symptoms	5 12 3	Trace 8 Trace	0 5 0	20 days before 3-4 hrs. after del. 3 days after del.	Voorhees' bag. Low forceps	Well

*In this column s.p.t. means slightest possible trace; s.t., slight trace; T, trace, and L.T., large trace.

†In this column 1— means less than 24 hours.

TABLE II—Cont'd

CASE	GRAVIDA	MONTH	SYSTOLIC BLOOD PRESSURE	URINE* ALBUMIN	SYMPTOMS	PERCENTAGE OF DYE IN THE SERUM AFTER 15 MIN. 1 HR. 2 HRS.	TIME OF TEST WITH REFERENCE TO DELIVERY†	DELIVERY	RESULT
38	X	6th	180	L. T.	Marked edema and blurring of vision. Several convulsions.	6 4 6 Trace	5 18 days after del.	Vaginal hysterotomy	Well. Previous toxemias with convulsions, and chronic nephritis
44	I	Term	160-180	s. t.	Slight edema. No other symptoms	11	2 days before	Vorhees' bag, high forceps.	Died on 9th day after delivery of streptococcus septicaemia. Autopsy showed mild toxic degeneration of liver with very slight central necrosis
46	V	8th	140-155 150 110-130 100-120	s. t. T. v. s. t.	Peritonitis No symptoms No symptoms	14 8 6 6	7 8 days after del. 4 15 days before Trace 5 days before 8 days after del.	Normal delivery	Well
49	I	9th	140-160	T.	Slight edema No symptoms	8	3 1 day before	Delivered by cesarean section (not in labor)	Well
50	VI	8th	100-110 150 170 110-120	- T. - -	No symptoms No symptoms No symptoms	2 8 3 3	0 18 days after 3 13 days before Trace 1-before 0 10 days after del.	Ruptured membranes and was given castor oil. Normal delivery	Well

*In this column s.p.t. means slightest possible trace; s.t., slight trace; T, trace, and L.T., large trace.

†In this column 1-means less than 24 hours.

abnormal tests which recovered, and (c) a composite curve of the retention after delivery in 11 of these 14 cases.

DISCUSSION

So far as this group of 44 cases is concerned it is apparent that the cases with marked retention of the dye are the more serious cases and

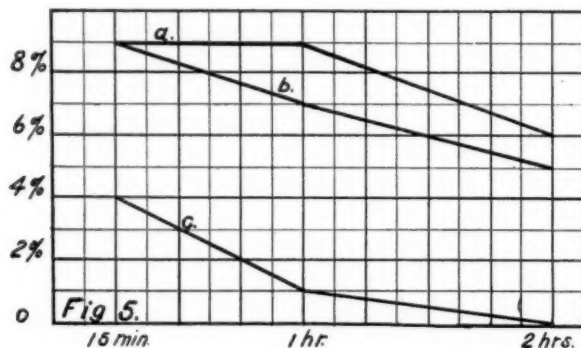


Fig. 5.—(a) Composite of curves in fatal cases; (b) composite of 14 abnormal curves in cases which recovered; (c), composite of curves obtained in 11 of these 14 cases after recovery.



Fig. 6.—Photograph of specimen of liver from Case 2, a typical eclamptic, who showed marked retention of dye. Very extensive necrosis.

have a higher mortality than cases with normal tests. In each of the 4 fatal cases which showed retention of the dye and in which it was possible to examine the liver postmortem, some evidence of liver damage was found, although the degree of retention did not appear to be an

accurate indication of the extent of the actual tissue destruction in the liver.

In Case 2 (see Fig. 4) which showed the greatest retention of any there was very extensive, grossly visible, necrosis of the liver, as is evident in Fig. 6. In Case 34 (Table 2) there was also extensive necrosis of the liver, although the retention of dye was not particularly great. However, death did not occur for two days after the last liver function test was done and it is quite possible for liver necrosis to occur in 48 hours. In Case 44 (Table 2) there was about the same degree of retention eight days after delivery as before delivery, yet at autopsy no more damage to the liver was apparent than would be found in any patient dying of a streptococcus infection. In Case 7 only a portion of the liver could be examined so that the real extent of the necrosis is unknown. In Case 37 (Table I), the one patient with a normal test who died, the liver showed definite slight necrosis, although the liver function test about 36 hours before death had shown no retention of dye. Cases 46 and 50 (Table 2) show that the "liver function" can apparently improve under treatment before delivery.

Such findings on the whole suggest that it is wise not to attach a great deal of importance at present to the result of the test in any given case. The most marked retention occurs in cases which would be recognized as severe toxemias or eclamptics on clinical evidence alone, so that the diagnostic value of the test will depend on whether comparatively slight retentions of the dye early in the course of the toxemia can be relied upon as placing the patient definitely in the pre-eclamptic group. In this connection it should be noted that normal tests will obviously be of no value unless obtained repeatedly at fairly short intervals up to the time labor starts, see e. g., Case 36 (Table 2) which showed a normal curve 20 days before delivery and a distinctly abnormal curve 3 to 4 hours after delivery.

SUMMARY AND CONCLUSIONS

The phenoltetrachlorphtalein test of liver function has been done in 20 normal pregnant women and 44 patients with a toxemia of pregnancy characterized by hypertension and albuminuria (including eight patients who probably had chronic nephritis and seven who had convulsions). The technic used was essentially the same as that described by S. M. Rosenthal¹⁵ and Rosenfield and Schneiders.¹⁶ The amount of dye retained in the blood serum was determined at intervals of 15 minutes, 1 hour and 2 hours after the intravenous injection of the dye.

The average figures for the normal pregnant woman near term are 4 per cent after 15 minutes, a trace (less than 2 per cent) after 1 hour, and none after 2 hours. Occasional slight retention of the dye occurs in clinically normal pregnancies (e. g., 5 per cent after 15 minutes, 5 per cent after 1 hour, 0 after 2 hours). The limit of normal may be

considered 7 per cent after 15 minutes, 3 per cent after 1 hour and a very slight trace after 2 hours.

About one-half of the patients with toxemia showed a definitely abnormal retention of the dye. Marked albuminuria and severe symptoms (including convulsions) were much more frequent in this group and the mortality was much higher than in the group of those with normal tests. Most of the patients who had undoubted chronic nephritis fell into the group with normal tests. Recovery from the toxemia was followed by a return to normal excretion of the dye within two weeks. In a few cases an improvement in the ability to excrete the dye has been observed before delivery.

In all the cases (4) in which the test was abnormal and in which postmortem examination of the liver was possible, some evidence of liver damage was found, though it was not always proportional even roughly to the degree of retention of the dye; also in the one patient with a normal test who died, the liver postmortem showed slight necrosis.

It may be concluded therefore that definitely abnormal retention of the dye in a patient with toxemia of pregnancy suggests that the toxemia is a severe one and suggests that it is of the pre-eclamptic rather than the nephritic type but, the degree of retention of the dye does not appear to be a reliable index of the amount of actual necrosis in the liver. A normal test on the other hand is of doubtful value unless obtained not more than a very few days before delivery or obtained repeatedly up to near the time of delivery. An accurate estimate of the practical value of the test must await further investigation.

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RECURRENT TOXEMIA OF PREGNANCY

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THE purpose of this paper is to call attention to some preliminary studies of certain cases of toxemia of pregnancy. I believe from this study that it is possible to regroup certain toxemias of pregnancy cases in a manner which is of great clinical importance, particularly in relation to prognosis. Recently facilities have become available through the opening of the new Boston Lying-in Hospital for the proper study of such cases, and since this proper study involves a period of considerable length, it is not yet possible to give any results from the work done there. I simply attempt now to furnish the evidence so far as it goes that led up to a feeling for the need of studying toxemias along a definite scheme and from the angle here presented.

The chief material from which the idea sprang in the order in which it became of interest, was from three sources: First, the study, several years ago and for another purpose, of 400 consecutive toxemias from the records of the Boston Lying-in Hospital. Second, the study of forty odd cases of toxemia from my own private records, and third, the study, within the last nine months, of the records and autopsies of two cases of toxemia dying at the Boston Lying-in Hospital during my service. In addition to these three main sources there have been sundry observations on other cases of toxemia seen in hospital which have tended to stimulate an interest in this phase of the problem. I will now take up the three main sources and attempt to give you briefly the ideas derived from each source.

1. From the study of the records of 400 consecutive toxemias, made primarily for the purpose of determining the relation of toxemia to uterine sepsis, certain other questions, aside from the main point, arose,—many of these having to do with the question of treatment of toxemias and not of importance to the matter in hand. Certain other questions arose, however, which were profoundly interesting and somewhat irritating which sowed the original seed of the ideas here offered. The first was that at once it became evident from the records that over and over again it was impossible to demonstrate satisfactorily whether one was dealing with chronic nephritis complicating pregnancy, or whether one was dealing with a so-called toxemia of pregnancy. About one-fourth of the 400 cases were toxemias with

*Presented as a thesis for admission to Fellowship at the Thirty-sixth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Philadelphia, Pa., September 19-21, 1923.

convulsions, whereas the rest were without convulsions. It had been a preconceived notion of my own, based on previous observation and on the accepted teaching in the school and hospital where I had learned my obstetrics, that chronically diseased kidneys complicating pregnancy seldom or never develop convulsions,—that it was far safer to carry them in this aspect than to carry the so-called acute toxemia. Without going into details, it became evident to me that this assumption, while possibly correct, speaking very broadly, was not nearly so true as I had believed. It is to be remembered that in these records we had, for the purposes of differentiation between chronic kidneys complicating pregnancy, the ordinary nephritis of pregnancy, and the acute toxemia, nothing to act on except sometimes a previous history and the clinical picture including the blood pressure and urinalysis, and all too infrequently, examination of eye grounds by men of varying competency, and I was left at the end of the study with the feeling that all we knew about the classification of the late toxemias of pregnancy amounted to next to nothing, and the very strong desire and hope that in time, with the erection of the new hospital, and the ability to study each toxemic thoroughly and follow it up with an adequate system, that we would be able to properly classify them, not purely for scientific interest, but because I came to feel that we were not handling these cases as well as we might for lack of adequate conception of where each case actually stood. Further, in the course of this study it became evident to me that there was a great group of cases which, though showing no clinical manifestations of chronic nephritis when not pregnant according to the ordinary methods of clinical observation, nevertheless, in all or in the majority of pregnancies, showed kidney insufficiency or toxic manifestations, and to this group I gave the name tentatively "recurrent toxemia of pregnancy," and set it aside in my mind for future study. It is with this group of cases that we are particularly concerned at present, and not with the other questions which I have suggested. To redefine what I have called "recurrent toxemia of pregnancy"; this term is applied to individuals who, while showing no demonstrable kidney lesion between pregnancies, nevertheless, in each pregnancy, or in the majority of pregnancies, show symptoms of kidney insufficiency or toxemia of pregnancy. On consulting certain monographs on toxemia of pregnancy, I found this condition has been recognized and observed in some degree under the general title of "Nephritic Toxemia or Kidney of Pregnancy" and in Kosmak's monograph (published in 1922) under the head "Nephritic Toxemia," (page 21) about a page is devoted to this condition, and in order to show the indefiniteness of present knowledge of this condition, I shall take the liberty of quoting this page.

NEPHRITIC TOXEMIA

The overburdening of the maternal kidney function during pregnancy undoubtedly serves as a starting-point for the frequent disorder to which the term "kidney of pregnancy" has been applied. In many instances an existing nephritis that can be traced to one of the exanthemata may undergo an exacerbation after years of quiescence. Every infectious disease may be complicated by nephritis during pregnancy and the prevalence of epidemic influenza during recent years, I believe, accounts for the increased number of the cases that have occurred lately. The presence of a chronic nephritis may be unknown to the patient and may make itself evident only during pregnancy, because of the increased burden placed upon the kidneys. The mere presence of albumin in the urine is not necessarily an indication of this lesion, as this may appear in minute quantities in the urine of perfectly healthy people and especially after severe exercise, but albuminuria characterized by more marked traces is associated with many pregnancies and constitutes a predisposing factor for a more serious involvement of the kidneys. In all cases where the albumin reaction averages 1 to 1,000, or more, we may assume that the normal limits have been exceeded, especially if this is accompanied by casts of the hyaline or granular variety.

Symptoms.—We find that the onset of nephritic toxemia is gradual in most instances, which serves to distinguish it from the renal symptoms in actual eclampsia. Appearing usually in the second half of pregnancy, it attacks primiparae more often than multiparae; it is also likely to be associated with multiple pregnancies. In addition to the urinary findings, edema of the ankles and legs is present in varying degrees and sometimes involves the lower portion of the abdomen. Puffiness and swelling of the hands is usually noted, although they may not be so evident as an edema. In a certain number of cases, headache, nausea, indigestion and slight visual disturbances are present.

It may be safely assumed that some direct and specific toxic factor is the exciting cause of this disturbance in the kidneys and not, as was formerly believed, a mechanical condition, such as that arising from increased intraabdominal tension, heightened blood pressure or added muscular activity during labor. Functional kidney tests seem to show that in these cases the excretory possibilities for water and salt are considerably reduced. This would point to a retention of these materials in the organism with consequent ill effect. In many cases the progress of the kidney involvement is apparently halted at this stage and no further extension of the process results. In others the incidence of more advanced toxic symptoms indicates an extension of the process clinically into a pre-eclamptic toxemia or into an actual eclampsia.

There is another group of phenomena to which attention must be called. Williams, among others, has pointed out that women who give birth to premature infants repeatedly are likely to be the subjects of this condition. It will be noted in these cases that the patient is apparently well up to the middle of her pregnancy, when albuminuria, with an accompanying edema, appears. The patient goes into labor and gives birth to a poorly nourished infant or one that is stillborn. The children are poorly nourished because of the insufficient placental nutrition, the organ in these cases being diseased and the seat of infarcts.

Following these observations, under the head "Pre-eclamptic Toxemia," I shall quote the first three sentences.

Pre-eclamptic Toxemia.—It may be difficult to draw a distinction between nephritic toxemia and that to which the term "pre-eclamptic toxemia" has been given and most cases are probably better labeled by the latter term. The clinical signs and symptoms show a marked resemblance to that class in which the kidney alone seems to play a leading part. A distinction may be made, how-

ever, in that the evidences of specific kidney lesions are less well defined and we may have presented simply the picture of a toxic disturbance.

It may be said then that I am making an effort in these observations to give more definiteness to the matter spoken of in the above quotations, and to point out what I am forced to consider of great importance, namely, placing this matter on a more satisfactory basis.

Having shown you the source of the idea of "recurrent toxemia of pregnancy" from source 1, I shall now take up source 2, namely, observation of forty-one toxemias seen in private practice, and show what these cases seem to demonstrate to me. Following the war I came into close association with an internist, and with this opportunity began to study all possible toxemias, which I saw in private practice, with his help. We began to have cases coming to us in the course of private practice who belonged in our minds in this class of recurrent toxemia of pregnancy. I am not going to burden you with individual case histories, but these selected cases all presented more or less the same history of repeated toxemia in two or more pregnancies. These patients were immediately turned over to the internist who went to work to establish to the best of his ability whether or not they had chronic nephritis. Some did, but most of them did not. Whether or not they did, they were all treated by the internist on the same basis, namely, that they did have kidney insufficiency, or that they would have it in the course of the pregnancy. This treatment consisted of the ordinary nephritis diet, rest each day and ten hours' sleep every night, absolute freedom from worry and care insofar as possible, absolute freedom from any hard work or getting tired. This included every form of exercise except moderate walking and every form of work, together with a thing which we had come to feel was most important of all, namely, absolute freedom from exposure to wet and cold. All these matters, simple enough and well known, we felt very important because I had again and again been impressed with the kidney insufficiency, shown by traces of albumin and elevated blood pressure, appearing in women following an afternoon's shopping in the wet or similar exposure. We soon began to find that under this care patients who had never before done so were going through their pregnancies without manifesting any signs of kidney insufficiency. These cases ranged all the way from recurrent miscarriages, which ordinarily often would fall under the head of habitual abortion, to the type case in which the patient had had induction of labor three times in succession and all three done by high class obstetricians for toxemia of pregnancy, each time somewhat earlier than the time before, and who under the care outlined above went through two pregnancies without manifestations of toxemia or kidney insufficiency. In addition to these observations, we had certain patients who showed no chronic kidney lesion, so far as the

internist's study could demonstrate, and who could not be made to understand the importance of these precautions, and who developed kidney insufficiency or toxemia on breaking the above named rules in such a definite way that we were impressed negatively as well as positively by the importance of these rules. For example, a doctor's wife had been delivered six years previously at seven and one-half months for fulminating toxemia and in the ensuing five years she had had four miscarriages between the third and fourth months, each time with slightly elevated blood pressure and very small trace of albumin. The fifth pregnancy, having demonstrated that she had no chronic nephritis between pregnancies, we pressed her to follow the careful routine life above outlined. She went along to five months without showing any kidney insufficiency,—she had felt fetal movements and was much encouraged at the trend of events. She wished to give a party and got up and broke her routine, running about all day and sitting up late at night. The next day she called on the telephone and announced that the fetal movements had ceased. Her husband took her blood pressure and found that it had risen twenty points and she had a slight trace of albumin. Two days later she miscarried a slightly macerated fetus of somewhat over five months.

In addition to these we had certain cases in which, in spite of the best possible care, toxic symptoms occurred in the pregnancy, necessitating induction or resulting in premature labor.

Two other facts stood out in the study of these cases which had previously impressed me in the study of the larger series from the Lying-in Hospital records (Source 1). First, that *occasionally* a true chronic kidney, which had been neglected in one pregnancy and had resulted in premature labor and the loss of the baby, or necessitated induction, could be taken through to a live baby under the best possible care as outlined above; and second, that the prognosis for the child in *most* chronic kidneys complicating pregnancy was bad, and that a repetition of pregnancy in these cases simply further damaged the kidney each time and left the woman worse off in health afterwards.

At this time I shall make no analysis and detail no cases in this group of forty-one cases studied. The series is too small to be of value statistically. I will say, however, that of these forty-one cases, not a few of which were seen late in consultation, and so inadequately studied and more or less lost track of subsequently, eight appeared on close study to belong certainly to the group of recurrent toxemias. We may say then that insofar as this insufficient number would indicate, approximately 15 per cent of all toxemias and chronic kidneys complicating pregnancy seen belong in this recurrent toxemia group. The figure in itself is of no particular value or importance, but serves roughly to indicate that this group is not negligible. In

several of these eight cases we have been able to place the patients subsequently in the hospital and do complete urinalyses, phenolsulphone-phthalein test and two-hour test, blood pressure, blood chemistry, ophthalmoscopic examinations, liver function test, etc., as I shall hereafter indicate in relation to the way in which we are now handling all toxemias in the hospital. The number is so few and the work so new to us that I shall say nothing now concerning these tests on these patients save that such investigation tended to demonstrate that these cases were not chronic kidney cases and did belong definitely in the group of recurrent toxemias.

The above observations tend to demonstrate theoretically that what I have designated as recurrent toxemias is a clinical entity, but the proof that such condition actually existed was lacking until this year when I was on service at the hospital (Source 3). During this service two patients were admitted and died in the hospital, and had partial autopsies, which demonstrated to me conclusively the existence of recurrent toxemia of pregnancy. These cases are so interesting in themselves and of such importance to the proof of my contention that I give them in detail together with the autopsy findings, including past histories. The pathologic material was examined in the laboratory of the Harvard Medical School. The material was taken fresh a few hours after death. Below are these cases in detail.

CASE 1.—Mrs. McN., No. 29980, para iv, age forty, admitted May 11, 1923.

In May, 1918, the patient was admitted in the eighth month of her pregnancy because of bleeding. A diagnosis of partial separation of the placenta was made and a Voorhees bag was inserted. Five hours later the patient was delivered normally of a stillborn baby weighing less than four pounds. After the birth of the baby a large amount of blood clot came away, and the placenta showed evidences of marginal separation. The patient apparently had no toxic symptoms but there is no further history recorded. Neither the blood pressure nor the urinary findings were noted. Patient had an uneventful convalescence and was discharged on the eleventh day well.

In November, 1918, she had a miscarriage at about ten weeks. In June, 1919, she reported to the clinic two months' pregnant. She had a blood pressure of 120 and her urine was negative. She had no symptoms until near the end of the fifth month when she began to have occasional headaches and slight edema. Early in the sixth month her blood pressure rose suddenly to 180 and she was sent into the hospital. She was treated for four weeks by rest in bed and free catharsis with salts. Blood pressure varied between 150 and 190 and urine showed a slight trace of albumin. The phthalein test was thirty per cent. She then went into labor and was delivered normally of a macerated fetus. The placenta showed marked degeneration. She at no time had any toxic symptoms other than an occasional slight headache and slight edema of the feet. Convalescence was uneventful. She was discharged on the fourteenth day blood pressure 140, urine still showing a slight trace of albumin. Clinical diagnosis, chronic nephritis.

She was not seen again until the present admission when she was sent into the hospital by a physician who saw her for the first time that day and found her flowing profusely. No further history was obtained. On admission she

presented the characteristic picture of an acute separation of the placenta. Uterus was hard and tender and she was flowing moderately. She was between seven and eight months' pregnant. Blood pressure and urinary findings were not recorded. She was in fairly good condition and was delivered at once by cesarean section. The uterus showed the usual hemorrhagic infiltration of the wall but it contracted well and was not removed. At the conclusion of the operation her pulse was 130 and of good quality. Two hours later her blood pressure was 140 and she appeared to be doing very well though she was flowing somewhat more than a normal case. The pulse rate did not go up. About six hours after operation she collapsed very suddenly and died before a transfusion could be given.

Permission for complete autopsy was refused but the abdomen was inspected by reopening the incision. The uterus was empty and firmly contracted. There had been no bleeding into the abdominal cavity. The surface of the liver was pale and mottled with small hemorrhages. Portions of the liver, kidneys and uterus were removed for microscopic examination. Diagnosis:—Hemorrhages into the uterine musculature; acute, hemorrhagic and necrotizing hepatitis confined mostly to the periportal areas; *acute* diffuse nephritis.

It will be noted (1) that on history this patient in her third pregnancy was diagnosed clinically as chronic nephritis and so treated, expectantly by several members of the staff, with a blood pressure of 190, which is practically never done if the case is considered an acute toxemia, (2) that at autopsy there was no chronic nephritis but the acute nephritic kidney of toxemia of pregnancy.

CASE 2.—Mrs. H., No. 30095, para iv, age thirty, admitted July 14, 1923.

First pregnancy was normal and ended in 1916 at full term with a normal delivery. In 1918 the patient had a miscarriage at four months. In December, 1921, the patient entered the hospital in the eighth month of her third pregnancy. She had not felt the baby move for several days. The day before admission she had been suddenly seized with a moderately severe pain in the right lower quadrant and had begun to flow. On entrance she was in labor and was flowing slightly. The uterus was tender over the lower half and was not relaxing well between pains. There were no other symptoms. The systolic pressure was 112. Fetal heart was not heard. She was delivered normally in five hours of a stillborn baby. The placenta followed promptly and was found completely covered with an adherent clot. A considerable amount of blood was passed after the birth of the baby. Patient had an uneventful convalescence and was discharged well on the fourteenth day.

On June 10, 1923, the patient entered the hospital because of severe epigastric pain. She had vomited once or twice. She had no headache, blurring of vision or edema. Marked tenderness in the epigastrium, no spasm or jaundice. B. P. 168/68. Urine showed a large trace of albumin and many hyaline and granular casts. A Rosenthal liver function test showed 6 per cent of the dye in the blood at the end of 15 minutes, 6 per cent at the end of one hour and none at the end of two hours. She was given a quarter of a grain of morphia and the following morning was much improved. Her epigastric pain had stopped and did not recur during this stay in the hospital. Her blood pressure came down and her urine cleared up rapidly. Phthalein test was 60 per cent. Blood taken the night of admission showed in the plasma an N. P. N. of 26.6, (mg. per 100 c.c.) B. U. N. 17.5, uric acid 7.3. On the eleventh day she was discharged with a blood pressure of 110, a negative urine and no symptoms.

Eleven days after discharge she was seen in the pregnancy clinic when she had a B. P. of 118, a trace of albumin and no symptoms. A week later on July 9 she was seen again in the clinic with the same B. P., a trace of albumin and no symptoms. On the morning of July 14 she entered the hospital again because

of steady severe epigastric pain which she had had for about six hours. She had severe nausea and had vomited several times, had moderately severe headache, and slight blurring of vision. B. P. was 188 systolic and urine showed a very large amount of albumin. The liver function test was repeated and at the end of 15 minutes there was 9 per cent in the blood, after one hour, 8 per cent, and after two hours, a trace. There was marked tenderness in the epigastrium. There was no jaundice, no edema and no bleeding.

A Voorhees bag was inserted about noon and the patient delivered normally of living, active eight months' baby at 3 P. M. About half of the maternal surface of the placenta was dark brown and necrotic looking. She bled rather more than a normal amount at delivery but appeared to be in good condition, pulse was 120, of good quality, B. P. 128. She continued to have very severe epigastric pain and about an hour after delivery went into severe shock from which she did not react. She had no convulsions or coma but died about three hours after delivery. Permission for complete autopsy was refused but a portion of the liver which was secured showed a pale cut surface mottled with small hemorrhagic areas. Microscopic examination showed an acute, hemorrhagic necrotizing hepatitis chiefly in the periportal areas. Section from a portion of the right kidney showed an apparently beginning acute diffuse nephritis.

This case is less convincing and necessitates the assumption that the separation of the placenta terminating the third pregnancy was toxemic in character, as well as the second four months' miscarriage, an assumption study of the private series shows not unfair, but is considered worth while reporting in this connection.

I have come to feel from the above that all toxemias both in private and hospital practice should be studied by some system which will enable us sooner or later to throw each case into one or another of these groups, namely, (1) definite chronic kidney, (2) recurrent toxemia of pregnancy and (3) acute toxemia of pregnancy. I am impressed by the fact that because we have not been able to do this, we have wasted kidney reserve in many chronic kidney cases in attempting to carry the patient toward term to no purpose; that we have mishandled the recurrent toxemia group by not recognizing it and not handling it with the strictest prenatal care, and I believe that once a patient has had a toxemia of pregnancy, she should be treated as though she were going to repeat it and belonged in the recurrent toxemia group until we find that she does not belong to this group by the test of complete pregnancy.

With this idea in view, we have outlined the following scheme for prenatal, natal and postnatal care for every case coming into the hospital in the future. This work was only possible by the establishment this year of a postnatal clinic, and of a pretty nearly absolute follow-up system. The outline itself embodies the ideas of some of the staff and the resident who is engaged in the actual follow-up work as well as in the laboratory work done on all toxemias. This outline is tentative and can undoubtedly be improved upon, but I feel it represents the way in which toxemias should be studied everywhere from our present knowledge.

ROUTINE STUDY OF TOXEMIC CASES

As soon as possible after admission a catheter specimen is examined and the Rosenthal liver function test is done. At the time that the liver function test is done blood is taken for blood chemistry. As soon as practicable a phenolphthalein renal function test is done. On cases which are being treated conservatively a daily urine specimen is examined and the other tests are repeated if it seems advisable to do so. Eye grounds are examined.

On the twelfth or thirteenth day after delivery a catheter specimen is examined, the phthalein test and the blood chemistry are repeated and the liver function test is repeated if the first one showed any deviation from normal.

All patients at the time of discharge are given a date on which to return to the postpartum clinic. This is ordinarily six weeks from the date of delivery. When they return to the postpartum clinic the toxemic cases in addition to the ordinary examination have their blood pressure taken and their urine examined. They are given a date some time within the next month on which to re-enter the hospital for observation. On this date the patient is admitted in the afternoon or evening and has a phenolphthalein renal function test done. The following morning her blood is taken for blood chemistry and she is started on a two-hour renal test. An albumin test is done on each specimen and several sediments are examined. The liver function test is repeated only if it has been abnormal the last time it was done. On the second morning the patient is discharged.

Cases which fail to return to the postpartum clinic are followed by the Social Service workers and induced if possible to come back for examination.

These cases are then grouped in a "Toxemic Index" under one or another title so that on reappearance in another pregnancy the group to which they are considered to belong, together with the data on which this decision was based, are available to the men on service.

I believe that we are justified in drawing the following conclusion tentatively from these observations. 1. That recurrent toxemia of pregnancy is a clinical entity distinct from chronic kidney disease complicating pregnancy and different from the acute single toxemia of pregnancy. 2. That whereas further investigation along laboratory lines may show that this group consists of patients who have a faulty kidney balance, that is, a balance that allows them to live without kidney manifestations when not pregnant, but when the load of pregnancy is added develop kidney insufficiency, we are not at present in a position to say that this is true. 3. That this group of recurrent toxemia of pregnancy may be subdivided judging by results into two classes—(1) in which the prognosis under the strictest possible prenatal care is good for both mother and child, and (2) in which the prognosis for the child is bad no matter what prenatal care is instituted. This division is not to my mind sufficiently recognized even by those who have felt that the grouping I have used here is clinically correct, and it is on this point that I would lay especial emphasis because it is of tremendous importance to certain individuals that, in spite of previous failures to obtain a living child, they can be taken through pregnancy and a living child obtained.

UTERINE PROLAPSE, CYSTOCELE, RECTOCELE. AN
ANALYSIS OF SIXTY-THREE CONSECUTIVE CASES
OPERATED UPON BY THE VAGINAL ROUTE

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THE woman with a slight degree of prolapse of the uterus associated with a slight cystocele and rectocele usually requires no operative interference during her childbearing period. The two main reasons for intervention before the menopause are extensive lacerations of the cervix with the resultant leucorrhea and the increased frequency of abortion and miscarriage, and procidentia with the uterus, bladder and rectum extruded, making the patient an invalid. The two reasons which stand out against surgical intervention during the childbearing age are, first, the danger of complicating future labors, since many cases are on record of women who had had one or more children by the pelvic route, and later had to be subjected to abdominal deliveries because of previous operations for the repair of lacerations of their genital tracts; and, secondly, because of the danger of recurrence of the conditions if the patients thus treated are subsequently delivered by the natural passages. Most operators, however, agree that when a woman has reached the menopause, if the lesions above mentioned are at all severe, they should be repaired so as to allow her to spend the rest of her years in comfort.

Uterine prolapse, although a source of many discomforts, does not threaten life; for this reason, if we are to recommend operation for this condition it is important to find a method attended with little operative risk, and at the same time one which will offer as good a chance of a cure as possible. After trying many of the accepted methods, both vaginoabdominal and vaginal, for surgically treating prolapse, I now prefer the vaginal route for patients at or after the menopause.

Of the sixty-three consecutive operations in this series, sixty were performed at the Carney Hospital and three in other hospitals; the ages of these patients are grouped in Table I.

As previously stated, all cases were operated upon vaginally; the transposition operation was chosen as the method of election and was performed on fifty-eight of the patients, while five had vaginal pan-

*Read at the Thirty-sixth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Philadelphia, Pa., September 19-21, 1923.

TABLE I.

AGES				AGES				
Between	40	and	45,	17	Between	65	and 70,	1
"	45	"	50,	17	"	70	" 75,	1
"	50	"	55,	14	"	75	" 80,	1
"	55	"	60,	7	"	80	" 85,	1
"	60	"	65,	4	Total			63

The oldest patient was 82 years old.

Table II shows the diagnoses in detail.

TABLE II.

DIAGNOSES

Procidentia	51, or 80%
First and second degree prolapse with cystocele and rectocele	12, or 20%

ADDITIONAL DIAGNOSES

Ulcer of vagina	2
Carcinoma of cervix (epidermoid)	1
Cervical polypus	5
Ovarian cyst	1
Diabetes	1
Myomata uteri	1
Cyst of perineum	1
Third degree laceration of perineum	1

hysterectomies with transposition of the united broad ligaments between the bladder and the vagina (modified Mayo technic). In connection with the fifty-eight transposition operations, amputation of the cervix was performed forty-six times; this was done on all cases where hypertrophy, elongation or laceration of the cervix was present. In all cases a colpoperineorrhaphy and, where an enterocele was present, obliteration or, better, shortening of the culdesac of Douglas, completed the operation.

The cases called suitable for the transposition operation were those where the uterus was normal in size or hypertrophied. Our experience has borne out Watkins' statement: "A uterus transposed that is too large never gives trouble afterwards because of remaining large. It always atrophies."¹ On the other hand, we have found by experience that the senile atrophic uterus does not adapt itself well to this procedure because the heavy bladder will push it down again. If that type of uterus is transposed, the cervix may subsequently appear at the vulva although the cystocele does not recur. The overlooking of this fact accounts for the three recurrences, Cases 6, 22, and 33, in this series, or a recurrence of 4.76 per cent. So far no recurrence has been observed where a uterus of suitable size was transposed. In the three women who were not relieved by this operation, the uteri were exceedingly small, one was the size of a large English walnut. The recurrences were treated by fixing the transposed uterus to the ab-

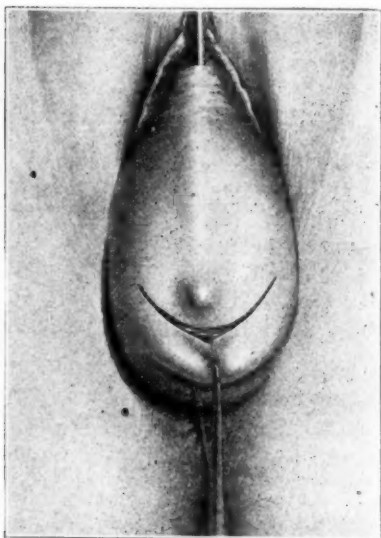


Fig. 1.—Male sound in the bladder with point towards operator to indicate bladder reflection and where first incision is to be made.

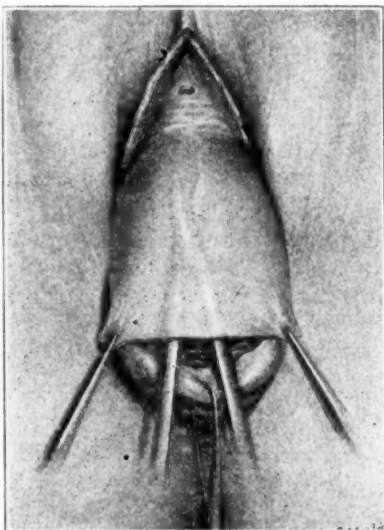


Fig. 2.—Upper edge of first incision drawn down and held taut by two Ochsner clamps, while the bladder is being separated from the fascia of the anterior vaginal wall by curved sharp-pointed scissors.

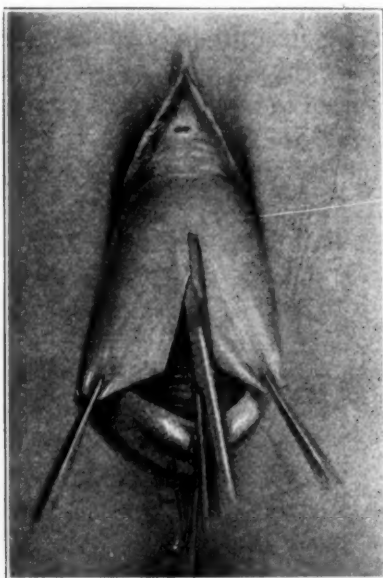


Fig. 3.—Incision of anterior vaginal wall, fascia and mucosa, in the median line.

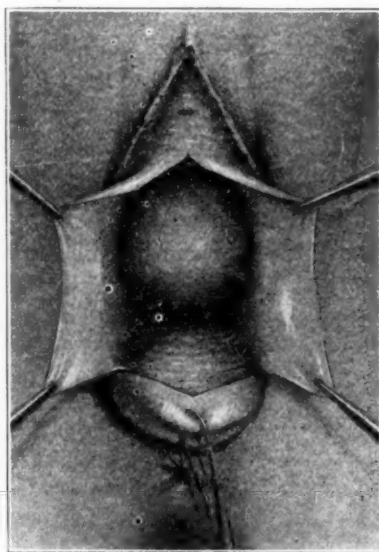


Fig. 4.—Bladder freed entirely of fascia from fundus to vesical neck. The vaginal flaps consist of fascia and overlying mucosa.

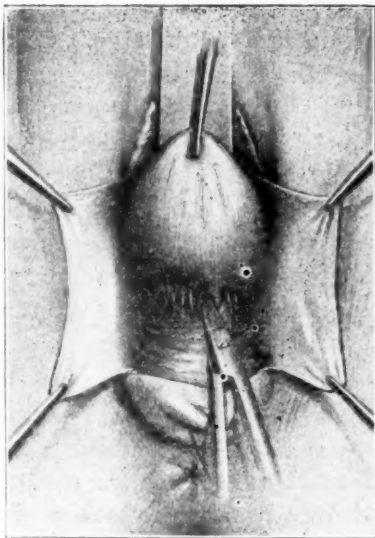


Fig. 5.—The bladder is pulled upwards with smooth tissue forceps, exposing the utero-vesical ligament which is being cut.

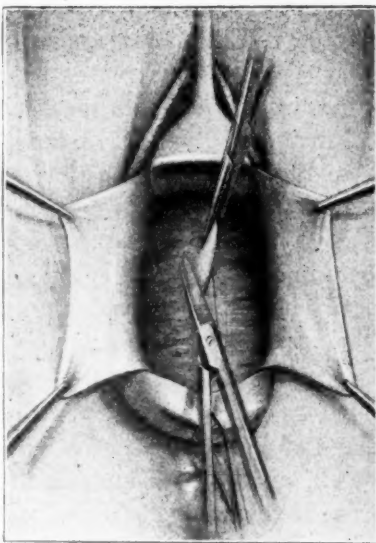


Fig. 6.—The bladder is held under a retractor and the utero-vesical peritoneum is picked up and opened.

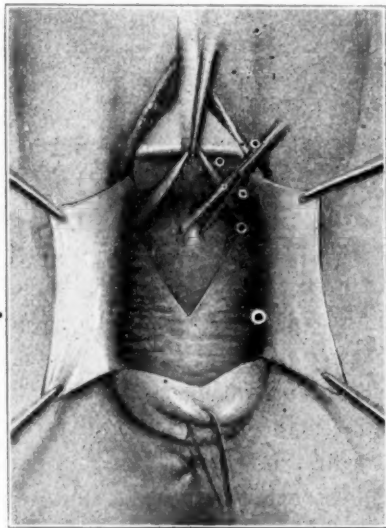


Fig. 7.—The peritoneum has been opened and the uterus is being delivered into the vagina.

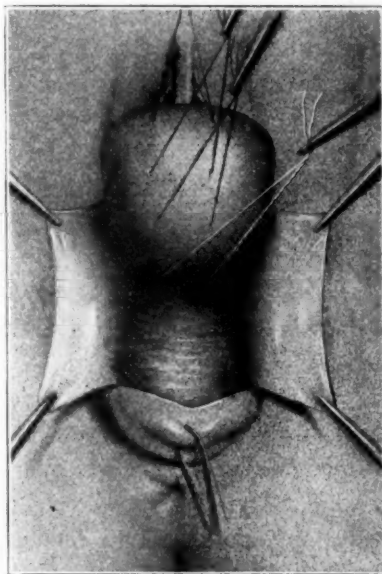


Fig. 8.—The uterus has been delivered into the vagina and the utero-vesical peritoneum has been sutured to its posterior surface at the level of the internal os. Four sutures of large chromic catgut are placed deeply into the uterus, in the median line. The lowermost stitch is placed at the junction of the corpus uteri and the cervix.

dominal wall; the final result was satisfactory but it necessitated a laparotomy which these patients were reluctant to undergo. Cases of that type are now treated by removing the uterus vaginally, suturing the broad ligaments together, and transposing them between the bladder and vagina. Five cases were operated upon by this method and so far no recurrences have been found. I have met but once a uterus that, although prolapsed, was too large to be transposed; this was in a younger woman, a good surgical risk, and she was relieved of her symptoms by a cervical amputation, anterior colporrhaphy, colpoperineorrhaphy, abdominal supravaginal hysterectomy and fixation of the cervix to the anterior abdominal wall.

Several methods have been advocated to reduce a large uterus in size before transposing it. Of these, two are in common use. The first consists of the excision of a wedge-shaped piece in the anterior uterine wall, suturing the incision thus made, and transposing the smaller uterus; if this method is resorted to, it is of advantage to remove the uterine and cervical mucosa. The second method is that of Vineberg² and consists of a vaginal supracervical hysterectomy with transposition of the cervical stump. We have not resorted to the first modification since it predisposes to suppuration. Vineberg has reported excellent results for his operation, but thus far we have not had the opportunity of trying it.

The two cases of ulceration of the vagina were kept in bed until their ulcers were healed before they were subjected to operation. Carcinoma of the cervix, although a rare complication of prolapse, occurred in one of the cases of this series; this was an epidermoid new growth grafted on an ulcer of the cervix of long standing; at the time of operation (vaginal hysterectomy) the neoplasm was circumscribed and, so far, the disease has not recurred. There were five cervical polypi which were removed from the cervix previous to amputation. One case was complicated by an ovarian cyst too large to be safely removed through the vagina; for this reason an abdominal cystectomy was performed two weeks after the plastic operation. The diabetic was made sugar-free before operation; she made an uneventful recovery and the vaginal incisions healed by first intention. In one case several myomata had to be enucleated before the uterus could be transposed. One patient had had a previous perineal repair elsewhere; it was found that some of the vaginal mucosa had been turned in at operation, so that a cyst the size of a small egg had developed in the perineum. This was removed while denuding at the second repair. All lacerations of the perineum encountered were of the second degree except one which was of the third degree; the repair in this case gave a satisfactory result.

TABLE III.

OPERATION	
Transposition operation	58
Vaginal panhysterectomy and transposition of broad ligaments (modified Mayo technic)	5
Colpoperineorrhaphy	63
Amputation of the cervix in the 58 transposition operations	46

Nitrous oxide-ether anesthesia was administered sixty-one times, while spinal anesthesia was resorted to twice, and this because the patients had myocarditis and were thought to be poor risks for a general anesthetic. While these operations may be done perfectly well under spinal anesthesia, we have reserved it for special conditions, feeling, as we do, that ether anesthesia, where no contraindications exist, is as safe a method as there is.

TABLE IV.

ANESTHESIA	
Nitrous Oxide Ether	61
Spinal Anesthesia	2

TECHNIC OF OPERATION

I. Transposition Operation.—The interposition operation for uterine prolapse and cystocele was first described by Watkins in 1899¹; later, in 1921,² he suggested the name transposition operation as a better term. His original operation is the foundation upon which the following technic was built.

Traction is made on the cervix by means of double hooks, a male sound is introduced in the bladder with the point toward the operator; by raising the tip of the sound, the bladder attachment to the cervix is clearly shown, a transverse incision is made through the vaginal mucosa and fascia below the point of the sound, which is then removed. It is very important to go through the fascia. The fascia and mucosa are grasped with Ochsner clamps, one at each limit of the incision, sharp-pointed scissors are introduced under the fascia and separate this with the overlying mucosa from the bladder up to about two and a half centimeters from the urinary meatus. The scissors are separated before they are withdrawn and the flap is incised in the median line with straight uterine scissors. The bladder is now separated as far as possible laterally, the uterovesical ligament, which holds the bladder to the cervix, is cut and the former is easily separated from the uterus. The bladder is now held under the symphysis by means of a retractor, the uterovesical peritoneum is opened, the fundus of the uterus is delivered into the vagina, and the peritoneum is sutured to the posterior uterine wall at about the level of the internal os. Four chromic catgut sutures are placed in the uterus: the first takes a deep bite in the fundus, the second is placed in the anterior wall two centimeters below the first, the third is similarly placed, while the fourth goes in deeply at the junction of the corpus and cervix where an angle exists. This last stitch, described by Johnson,⁴ when threaded through the vaginal wall and tied, straightens out the uterus and throws the cervix well back in the pelvis. We prefer this to the shortening of the sacro-uterine ligaments, a procedure recommended by Jellet⁵ to accomplish the same

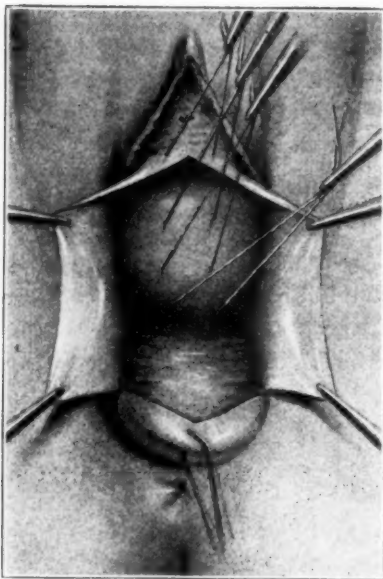


Fig. 9.—The upper stitch has been rethreaded and passed through the anterior vaginal wall, fascia and mucosa. After the excess of anterior vaginal wall has been cut away, the remaining three sutures are rethreaded, passed through the fascia and mucosa, and the four large sutures are tied. The lowermost stitch when tied straightens out the uterus and throws the cervix well back.

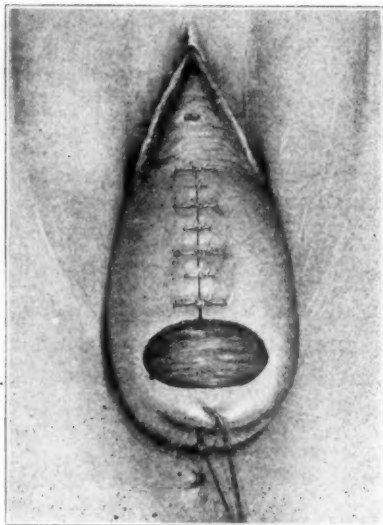


Fig. 10.—The four large sutures have been tied and intermediate sutures of finer catgut have been placed between them. The intermediate sutures also pick up the uterus, so that no dead spaces are left.

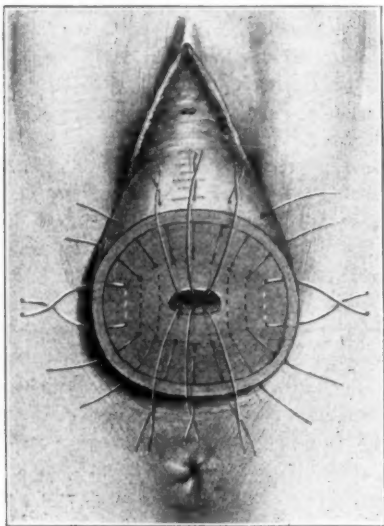


Fig. 11.—Amputation of the cervix and the sutures in place. The mattress suture at each angle is important because it obliterates a dead space.

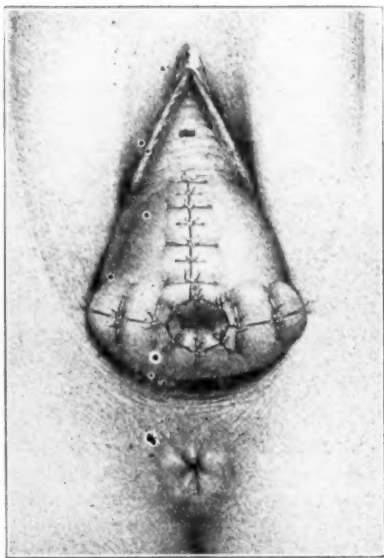


Fig. 12.—The interposition operation and the amputation of the cervix have been completed. Note the roomy external os. The uterus is now pushed back in the vagina.

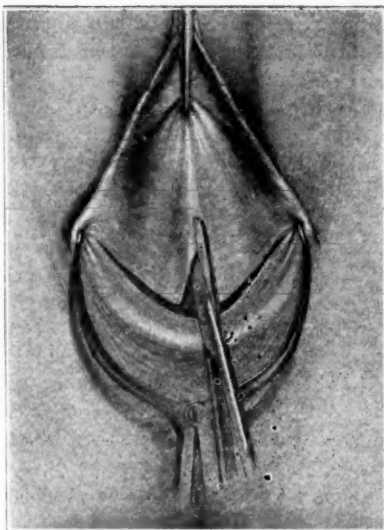


Fig. 13.—A self-retaining perineal retractor is introduced, the points entering below the ducts of the vulvo-vaginal glands. The crest of the rectocele is picked up by a forceps and the pelvic floor is opened by a curved incision at the mucocutaneous border. The rectum is separated from the fascia of the posterior vaginal wall by curved sharp-pointed scissors, and the flap, fascia and mucosa, is incised in the median line.

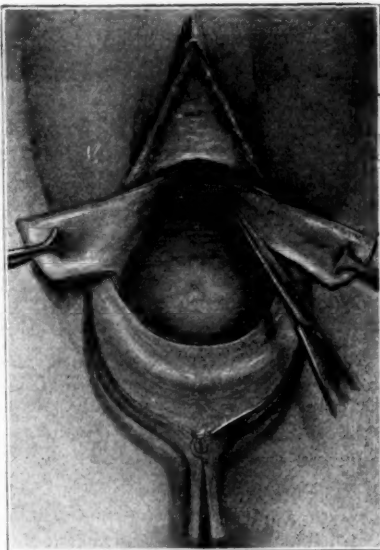


Fig. 14.—The rectum has been exposed and the excess of posterior vaginal wall, fascia and mucosa, is being cut away.

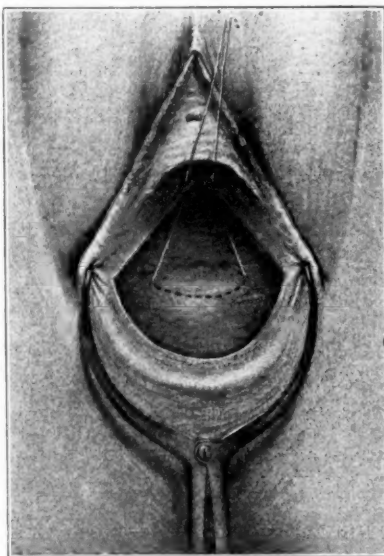


Fig. 15.—A mattress suture of chromic catgut attaches the rectum to the unstretched upper portion of the vagina. This stitch is tied above the upper angle of the denudation.

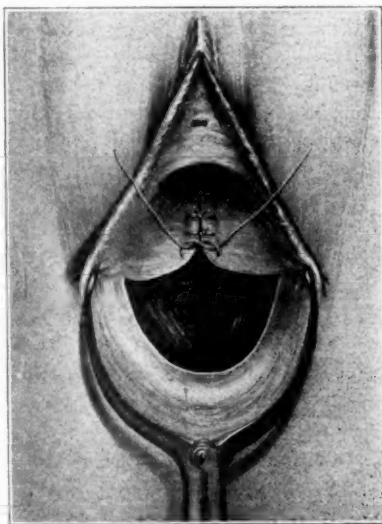


Fig. 16.—The posterior vaginal wall has been closed with interrupted sutures of chromic catgut. The levators covered with their fascia are exposed.

purpose. Furthermore, we feel that this stitch is a most important one and that it helps greatly to the success of the operation. The excess of the flaps, fascia and mucosa, is now cut away, the four sutures are rethreaded, passed through the vaginal wall and tied, and the spaces between these four sutures are closed in with interrupted sutures of chromic catgut, each stitch taking a deep bite of the uterus, so that no dead spaces are left between the uterus and the vagina, an important step in preventing the formation of a hematoma and suppuration. We do not separate the fascia from the mucosa, as we believe that equally good support may be obtained if the two layers of tissue are sutured together.

The cervix is amputated by the Emmet method, chromic catgut being used entirely as suture material.

The perineum is repaired in the following manner. A Gelpi self-retaining retractor is introduced, the points entering the tissues just below the ducts of the vulvovaginal glands, the high point of the rectocele is grasped, in the median line, by an Allis forceps, while posteriorly a similar instrument picks up the mucocutaneous border, also in the median line. The pelvic floor is opened by an incision extending from the point below the right duct of Bartholin to the posterior Allis forceps and then extending upward to the point below the duct of the vulvovaginal gland on the left. The anterior edge of the incision is picked up with tooth forceps, and sharp-pointed scissors are introduced between the rectal fascia and the rectum, the separation is carried upward to the cervix, when the scissors are separated and withdrawn. The fascia and the overlying mucosa are now incised in the median line with straight uterine scissors and the flaps are separated from the culdesac and rectum above, and from the pelvic slings below. The excess of posterior vaginal wall is cut away, thus leaving a diamond-shaped area of denudation. If an enterocele is present, the culdesac is opened, dissected free on all sides and removed as a hernial sac, the opening is closed by suturing the sacrouterine ligaments together, from side to side, as suggested by Ward,⁶ Frank,⁷ and others. In the absence of an enterocele we do the rectopexy recommended by Ward.⁸ The upper part of the vaginal incision is now closed by interrupted chromic catgut sutures, each one picking up mucosa and fascia, until the upper edges of the levators are reached. These muscles, covered by their fascia, are approximated in the median line, in front of the rectum, by means of three interrupted chromic catgut sutures, the triangular ligament is approximated by a continuous stitch of fine chromic catgut, and the external perineum is closed by a subcuticular stitch of the same material.

II. Vaginal Panhysterectomy with Transposition of Broad Ligaments. (Modified Mayo Technic.)

The technic is identical with that of the transposition operation until the uterus is delivered into the vagina. The culdesac of Douglas is then opened, an Ochsner clamp is applied on each side of the cervix, taking in all the parametria from below, while a similar instrument is applied from above on each broad ligament in such a way that it meets the lower clamp of the same side, and the uterus is removed. The tubes and ovaries may be removed or not, according to indications. After the removal of the uterus, the clamps are brought together and the broad ligaments are united by a continuous mattress suture of large chromic catgut; this suture is placed two to two and a half centimeters from the cut edges and serves as a hemostatic as well as an approximating stitch. The raw edges are carefully turned in with fine chromic catgut. The excess of the vaginal flaps, fascia and mucosa are cut away, the upper edge of the united broad ligaments is sutured to the upper angle of the vaginal wound and the rest of the incision is closed with interrupted sutures of chromic catgut, each one pick-

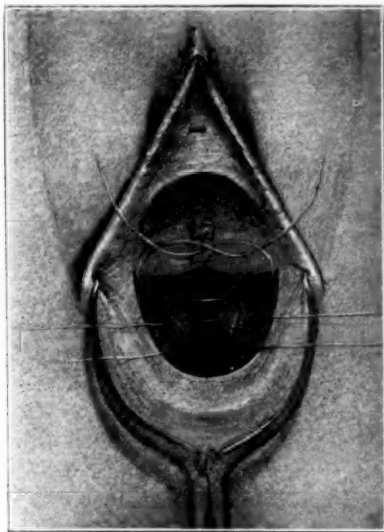


Fig. 17.—The posterior vaginal wall has been closed with interrupted sutures. The levator ani muscles, and the fascia covering them, are being approximated by three chromic catgut interrupted sutures. The uppermost stitch is being tied.

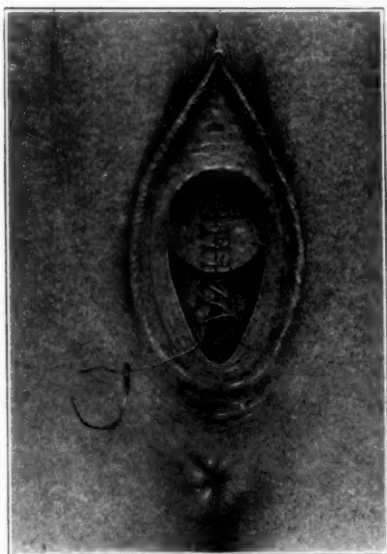


Fig. 18.—The posterior vaginal wall has been closed and the levators and their fascia have been approximated. The triangular ligament is being approximated by a continuous stitch of fine chromic catgut.

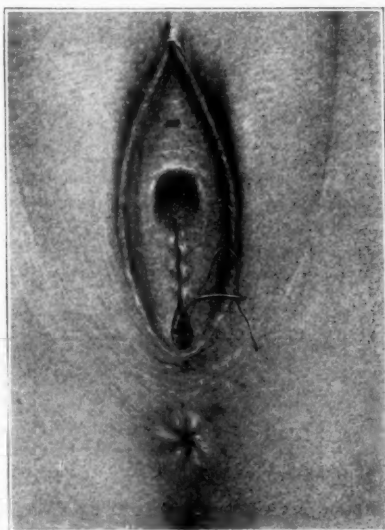


Fig. 19.—Closing the vaginal wound with a subcuticular stitch of fine chromic catgut.

ing up the broad ligaments. These ligaments are thus placed between the bladder and the vagina and act as a support for the former. The perineum is then repaired by the method described above.

TABLE V.

RESULTS	
Mortality	0
Result satisfactory	60
Recurrences	3, or 4.7%

The absence of mortality in a series of sixty-three women, a number of them advanced in years and physically worn out by hard work, leads one to infer that this method is safe. All patients were examined at the time of their discharge from the hospital and were asked to report a month later for further examination. At this time they were asked to return if the least signs of "falling down of the parts" became evident. To date but three recurrences have been found, and these, as we have explained above, were due to the fact that we had transposed uteri which were too small. Were we doing these cases now, we would use the second method described.

The first case was operated upon January 4, 1916; the last case on December 9, 1922.

CONCLUSIONS

1. It is generally considered that at, or after, the menopause, the vaginal route offers a safe method of treating women with uterine prolapse, cystocele and rectocele.
2. Vaginal operations are attended with a comfortable convalescence, and may be done on old women where an extensive laparotomy would be contraindicated.
3. We advocate the transposition operation in cases where the uterus is normal in size or hypertrophied.
4. When dealing with an atrophic uterus we have obtained better results with the vaginal panhysterectomy with transposition of the united broad ligaments. (Modified Mayo Technic.)
5. If, in doing the transposition operation, the incision in the anterior vaginal wall is made as described, the fascia and overlying mucosa will be an entity, and will help greatly in keeping the uterus in exaggerated anteversion.
6. Failure is apt to be the case if the uterus is attached to the vaginal mucosa only.
7. A stitch introduced at the juncture of the cervix and corpus is important because when passed through the vaginal flaps and tied, it holds the cervix well back in the pelvis.
8. The bladder should be well separated from the vagina and uterus so that it will lie smoothly, and not in folds, on the transposed uterus.

9. An adequate repair of the pelvic floor is essential in all cases.
10. Spinal anesthesia may be used to advantage in cases where the use of a general anesthetic is contraindicated.

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395 COMMONWEALTH AVENUE.

THE CONSTRUCTION OF AN ARTIFICIAL VAGINA, WITH REPORT OF A CASE

BY C. JEFF MILLER, M.D., NEW ORLEANS, LA.

CASE L. R., white, age nineteen, was admitted to my service at Charity Hospital in February, 1921. She had had the usual diseases of childhood, but her past history was entirely negative otherwise, except for the fact that she had never menstruated. At 14 she began to have attacks of abdominal cramps, at times so severe that a physician was called to see her, and with these attacks her breasts enlarged and became quite painful. She paid no attention to date at the time, but she now believes that these attacks simulated the normal menstrual cycle. They continued for several months, then disappeared entirely, and have never recurred. For several years her failure to menstruate was not regarded as abnormal, but when at 17 the flow had not appeared, she consulted a physician, who, after examination, told her she had no vagina. Shortly afterwards she was examined under anesthesia, and the hymen ruptured, but the vagina could not be re-established. Two years later she planned to be married, and entered the hospital for operation.

Examination showed a white female, about 5 feet 2 inches in height, weight about 120 pounds, appearance entirely feminine. Her color was extremely pallid. The general examination was negative, except that both kidneys were palpable and ptosed. The labia majora and minora were present, and apparently normal, as was the clitoris, but there was no evidence of a vagina.

The routine laboratory tests proved negative, and four days after admission a typical Baldwin operation for the construction of an artificial vagina was done under ether anesthesia, the entire procedure consuming about forty minutes. Examination of the pelvis after the abdomen was opened showed a uterus about an inch and a half in diameter, with a poorly developed musculature. The ovaries were about one-sixth their normal size, the surface was perfectly smooth, and there was no evidence of corpora lutei. There were mere vestiges of tubes on both sides.

Her convalescence was entirely without incident. The iodoform pack inserted in the vagina at operation was removed on the fourth day and replaced by another, which procedure was repeated on the sixth and eighth days. The sutures were removed on the thirteenth day, the wound healing primarily. Four weeks after the first operation the introitus was dilated under ether, and another pack inserted. She was discharged a week later, in excellent general condition.

From the patient's standpoint the result has been so satisfactory that I feel justified in reporting the case. She has been examined at intervals during the two years which have elapsed since the operation, and examination bimanually, or with the ordinary speculum, gives no hint that an abnormal condition is present. There is no contraction at any point, and the roomy area corresponding to the vagina is really surprising. She has never menstruated, and of course has never conceived, but this could not be expected, owing to the underdevelopment of the uterus and adnexa; marital relations are possible and entirely satisfactory. She has been carefully questioned at intervals as to the presence of a discharge corresponding with the active digestive process, a feature which is often reported as one of the objections to this type of operation, but she states that this has never been present.

In spite of the satisfactory results in this case, and in similar instances reported in the literature, I am still doubtful how far we are justified in advising operation for congenital absence of the vagina. I believe that there is a moral question involved in urging a patient to submit to such a radical operation. Any intestinal operation carries with it a certain mortality, and in cases where the vagina is absent, the uterus and adnexa are usually underdeveloped also, and the most successful outcome to be hoped for is that marital relations will be possible. In this particular case the risk of operation was carefully explained to the patient, but in view of her impending marriage she chose to take the chance.

After a review of the various procedures suggested for the condition, the Baldwin operation was selected, partly because it gives an opportunity to examine the pelvic organs, and to give some prognosis as to future function. The Schuchardt operation was considered and rejected. It is generally supposed to be attended with less risk to life, and there is less possibility of annoying secretions from the bowel mucosa, but the danger of fistulae is very grave, and there is serious risk of disturbance of the normal bowel control.

512 HIBERNIA BUILDING.

A NEW METHOD OF INSURING STERILITY FOLLOWING CESAREAN SECTION

By FREDERICK C. IRVING, M.D., BOSTON, MASS.

(From the Department of Obstetrics, Harvard Medical School.)

PRESENT methods for preventing pregnancies whenever indicated following cesarean section by operation on the fallopian tubes are three in number and are all open to certain objections.

1. Double ligation of the tube and resection of the intermediate



Fig. 1.—The tube is doubly ligated with chromic catgut and divided about $1\frac{1}{2}$ inches from the uterine cornu. The proximal portion is dissected free from its mesosalpinx with a sharp knife, keeping closely to the tube to avoid bleeding. Its free end just proximal to the ligation is transfixed with a long, round-pointed straight needle carrying a double suture of chromic catgut. The knotted loop of this suture is slipped over the free end of the tube and the suture drawn tight.

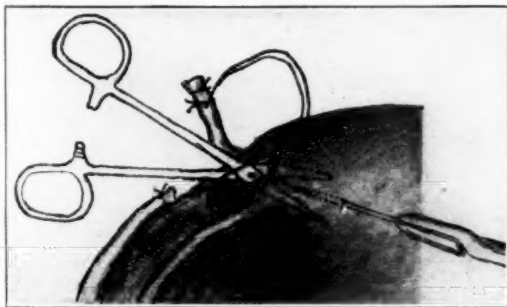


Fig. 2.—A small incision is now made in the serosa of the uterus on its anterior surface just above the insertion of the round ligament. The butt of the needle is grasped with a sharp-pointed hemostatic forceps. The point of the needle is thrust into the incision, through a portion of the muscularis and out again on the surface of the serosa about an inch from the incision. The closed hemostat, still grasping the needle, follows it into the muscularis. The jaws are spread, thus forming a pocket in which lies the traction suture attached to the tube. The hemostat is withdrawn.

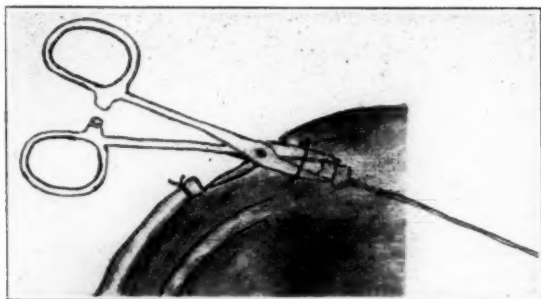


Fig. 3.—The tube end is grasped with the hemostatic forceps and inserted in the small incision. Traction on the suture causes the tube to enter the pocket prepared for it in the muscularis.

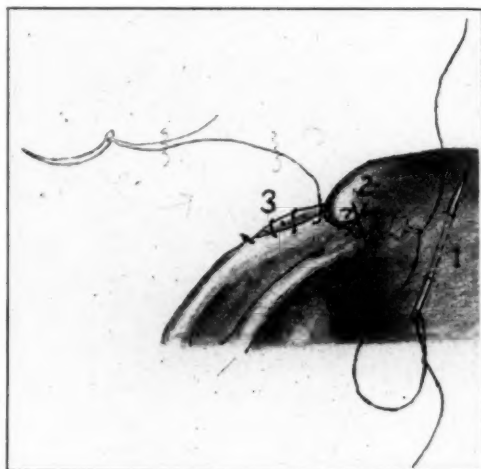


Fig. 4.—The operation is finished in the order shown by the drawing. (1), One strand of the double traction suture is cut and a stitch taken through the uterine surface at right angles to its former direction. The two ends are tied and cut. (2), The small incision in the serosa is closed by a figure 8 suture which also provides additional anchorage for the tube. (3), The end of the distal portion of the tube is buried between the leaves of the broad ligament.

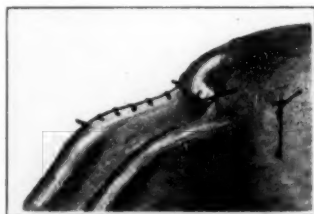


Fig. 5.—The operation is completed and all peritoneal surfaces have been approximated. As the uterus undergoes involution the buried proximal ends of the tubes become more and more compressed and should soon be obliterated. Since no time is wasted in checking hemorrhage the operation can usually be completed more rapidly than by the older method of tubal excision.

portion has occasionally resulted in slipping, premature absorption or cutting-out of the proximal ligature. Patency has thus been re-established and pregnancy has resulted.

2. Burying the infundibulum between the leaves of the broad ligament is open to the objections that the tube is not divided or even ligated and that its fimbriated extremity must necessarily be embedded somewhere near the ovary. Should the sutures used for this purpose fail to hold the wandering ovum might find no great difficulty in entering the distal end of the tube.

3. Resection of the tube with a wedge-shaped excision of its uterine insertion is the most effective method in general use today. Not infrequently, however, removal of the uterine portion is accompanied by free bleeding which may demand considerable time for its control by suture-ligature.

An ideal method should be bloodless, should include division between double ligatures and the burying of both cut ends at as great a distance from each other as possible. With this in mind I have devised the method described in the legends accompanying the following illustrations and I am now using it with complete satisfaction.

443 BEACON STREET.

A METHOD OF TREATMENT OF SEVERE TYPES OF DYSMENORRHEA WITH A REPORT OF RESULTS IN 230 CASES

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ABOUT seven years ago, at the Academy of Medicine, Toronto, I outlined a method of treatment for severe types of dysmenorrhea, and reported the results in about ninety cases. Since then I have continued to use the method, and have employed it in two hundred and thirty cases. My ideas have sufficiently crystallized to warrant a second report, and although I have no little temerity in proposing to this Association a method for the relief of severe dysmenorrhea, in addition to the already too lengthy list, I feel it is sufficiently easy and safe of application and satisfactory in ultimate results to recommend its use.

The pain of dysmenorrhea may begin before the commencement of the menstrual flow or at the beginning of the period; it may disappear as soon as menstruation is definitely established, may persist during the whole of the period with more or less variation in intensity; and in some cases it continues for a short time after the cessation of the flow. It is difficult to define exactly what degree of pain constitutes

*Presented as a thesis for admission to Fellowship at the Thirty-sixth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Philadelphia, Pa., September 19-21, 1923. The complete paper will appear in the current volume of the Transactions of the Association.

dysmenorrhea, pain being a subjective symptom. Moreover, menstruation is nearly always normally attended by a certain amount of physical, mental or local disturbance. This seems to be part of the price that our women pay for higher civilization, which has accentuated the excitability of the nervous system, for we are told that women belonging to uncivilized tribes, do not experience much discomfort at such times. The cases I report all belong to the *severe* and *obstinate* types of dysmenorrhea. They have all been severe enough to cause a greater or lesser degree of disablement, and in some cases to seriously affect the general health, and all had been previously subjected to various forms of treatment without relief.

The most prominent symptom of dysmenorrhea is pain, which in the severe cases is more acute than any pain in the pelvic region in the absence of physical signs of disease. The intensity of the pain necessarily varies, but the symptoms are sufficiently characteristic to classify the disease as an entity. Herman¹ expresses the opinion that dysmenorrhea should be described as a disease and not a symptom: The symptoms are identical with those described by writers fifty or a hundred years ago, and do not call for a long description here. The pain always begins in the pelvic region, usually in the hypogastrium, radiates to one or both iliac regions, to the sacrum, to the loins, and down the thighs. The pain at first is of a dull, aching character but it commonly becomes paroxysmal, resembling colic, and is often severe enough to cause the patient to writhe, perspire, vomit and sometimes faint. Most of my patients usually have had to remain in bed for one day, some two or three, and in exceptional cases even four or five days each month; and the pain was not relieved by lying down. With some women the spasmodic pain lasts only a few hours, but with others from twenty-four to thirty-six hours. After the acute exacerbations have passed off, the patient is left with a general soreness which persists for a varying length of time.

Many earnest investigators have, over a long period, presented countless hypotheses and theories on the etiology of dysmenorrhea and many methods of treatment have been advised, even to the point of the ridiculous, and in some instances undoubtedly most distasteful to the patient, who is usually a young unmarried woman. A review of the literature leaves an impression of confusion and one fails to find any definite or authoritative result either in the discovery of causation or an unanimous opinion as to a reasonable, safe and in-offensive treatment. One is bound to confess that all our theories and suppositions end for the most part in mere words. The bibliography is packed with extensive and often wearisome scientific speculations, but we still have no uniformly accepted explanation even of the causation of menstruation; and it necessarily follows that we

know still less of the causation of dysmenorrhea. Therefore, the treatments which have been adopted up to the present, must be regarded as almost entirely empirical. In fact we must admit that in the last hundred years the medical profession has advanced very little on this subject. It is illuminating to read old and new textbooks and old and new journals, and see what a bugbear it has long been and still is to the profession.

* * * * *

As regards treatment, undoubtedly careful attention to the general health at the time of puberty, would greatly diminish the number of cases. In some instances in which mental development has been encouraged at the expense of physical development, it is advisable to allow the girls to give up attending school for a year or so, and to spend the time in the country, as far as possible out-of-doors. If the endocrinologists are correct, this is the time that gland therapy should be employed. In addition to this it is necessary to treat suitably, any general symptoms or disease presenting, such as indigestion, constipation, chlorosis, anemia, tuberculosis, malaria, syphilis and chronic poisoning from various causes, as it is necessary to treat these conditions whether dysmenorrhea is present or not. As regards local treatment, so many measures have been tried with varying success, that it is impossible to enumerate them. Palliative treatment consists chiefly in the application of heat to the abdomen, Bier's hot air treatment, hot sitz baths, etc. Many have thought that they have found specifics for the pain in different drugs, and guaiacum resin, uzarin, nitroglycerin, atropine, sodium citrate, castor oil, chlorodyne, and all the coal tar analgesics have been vaunted at different times; and now many physicians turn to the widely advertised preparatory preparations, such as Hayden's viburnum compound and Smith's ergoapiol. Alcohol or opium and its derivatives will always relieve pain, and I am sorry to say are more frequently prescribed than one would imagine. Removal of the ovaries is an infallible remedy for dysmenorrhea, which I mention only to condemn it. The case in which it would be indicated has never come under my observation, and I do not believe it would be justifiable under any circumstances.

In 1897 Fliess¹⁴ first drew attention to what he describes as genital "stelle" or sensitive spots in the nose, and pointed out their apparent connection with certain disorders of the female genital organs. Since that time contributions have been made to the literature by several writers, including Sigmund,¹⁵ Schiff, Koblanek, Seifert and Brettauer,¹⁶ who emphasize the value of nasal treatment in some forms of dysmenorrhea. Sippel and Kuttner,¹⁷ do not believe in the specificity of the so-called sensitive spots, and other writers have shown that

the application of cocaine to other mucous membranes acts equally well. It is significant that the authors advocating the treatment have not broken silence since their first publication. In the few cases in which I have tried this method, it has proved a failure. Nor have I been able to obtain the beneficial results reported by some writers from organotherapy. I have tried most of these preparations, including ovarian extract, thyroid extract, pituitary extract, extract of corpus luteum, mammary extract and combinations of them, and the results have been quite as indifferent as those obtained from administration of iron, aloes, strychnine and manganese. Electricity has been advocated by some writers, notably Sprague,¹⁸ Lapthorn Smith¹⁹ and Goelet.²⁰ I have not tried this remedy nor have I used tampons in essential dysmenorrhea, as local applications of this kind are objectionable in young women. Recently it has been advocated to treat the tonsils or remove them, and Hernamann and Johnson²¹ recommend x-ray treatment for dysmenorrhea. I anticipate that soon someone will advocate the use of vitamins.

Although there is some merit in all this multitudinous conglomeration of ideas as to etiology, and also, we may admit, much virtue in many of the numerous remedies proposed, why not come down to a simple basis of fact? It would simplify our classification into two groups, (a) those cases in which a gross pathologic lesion is demonstrable, (b) those cases in which a gross pathologic lesion is not demonstrable, namely, essential dysmenorrhea. Our treatment would then be very much simplified. Group (a) would be treated by the removal or cure of the pathologic lesion with which the dysmenorrhea is associated. In this group would be placed such cases as reported by Rona,²² McIlroy,²³ Suckling,²⁴ Pardhy and Billington,²⁵ and Sippel. This group does not come within the scope of my paper, for these are not cases of essential dysmenorrhea. Group (b) would be treated by suitable hygienic measures, regulation of diet, habits of dress, the correction of other matters of this kind, and the administration of simple remedies to relieve the pain. But if the case did not respond and relief was not obtained and it was necessary to administer alcohol or opium and its derivatives or larger doses of coal tar products; or if the condition was of a disabling character, then more radical measures would be undertaken.

One is apt to forget what many writers have pointed out, which is undoubtedly a fact, that essential dysmenorrhea is always cured by childbirth. Women who have borne children do not suffer from dysmenorrhea unless they have had a mild infection or some gross pathologic lesion is present. And it is remarkable what various pathologic lesions may be present in women who have borne children without causing dysmenorrhea. Therefore, in bad cases of essential dys-

menorrhoea, cases which are not amenable to palliative treatment and are disabling, it should be our aim to change as far as possible the nulliparous uterus into one resembling a parous uterus, and this should be by the simplest and safest method possible.

Dilatation of the cervix has been recommended for a long time. Deweis²⁶ in 1826 reports dilating with metal bougies with satisfactory results. The technic is so simple that there are few general practitioners who have not had some experience of it. The proportion of cures which result from it have been variously estimated, but there is a consensus of opinion among the majority of general practitioners and specialists, that the relief obtained is only temporary. The patients are relieved for a few months and then pain returns as bad as ever. Instead of metal bougies, laminaria tents were popular for some years, but have been discarded on account of the uncertainty of the result and the danger of infection. To overcome the tendency to recurrence, the stem pessary has been used by many operators, and in cases in which it has been kept in position for some months, relief from pain seems to have been more permanent. My experience of the stem pessary has been limited for the reason that I feel that I have a simpler, cleaner and safer method. One case has come under my notice where, after the use of a stem pessary, such a severe infection resulted, that later a complete removal of the pelvic organs was necessary. Certain operations have been devised by Dudley, Pozzi and others, all of which are on the principle of splitting the cervix, but none of these split the internal os, and although they are often successful for sterility, they have not given great satisfaction in the treatment of dysmenorrhoea. Heywood Smith²⁷ writing in the "Lancet" in 1890, recommended dilating to No. 12 Hegar and then cutting the internal os bilaterally and inserting a stem pessary in the cervix for five days, so that the fibers would not unite; but he does not say whether he has used the method and does not report any results. Blair Bell states that in a few cases he has dissected back the mucous membrane from the anterior surface of the cervix, as is done in the first step of vaginal hysterectomy, and has severed the internal os from without inwards, and reports good results in his cases, although he does not mention any means employed to obtain a permanent dilatation.

I have come to the conclusion that no matter what may be the cause of essential dysmenorrhoea, the site of the trouble is at the internal os, and that by severing this powerful, circular, fibromuscular ring and producing a dilatation, which is maintained long enough that the muscle does not contract again, nearly all cases of dysmenorrhoea can be cured, or if not entirely cured, a sufficient measure of relief can be obtained to warrant the procedure. In the first

cases in which I severed the internal os, and did not adopt any means of maintaining the dilatation, my results were not much better than from ordinary dilatation. I then adopted the principle of firmly packing the uterus and cervix with iodoform gauze and leaving it undisturbed until the eighth day. In some cases it is not necessary to cut the internal os, as dilatation may be easily proceeded with until a sufficient degree is obtained; but in the majority when one has dilated to No. 10 or No. 11 Hegar dilators, one comes upon an unyielding band as resisting as a teething ring, as someone has suggested; the muscle of the internal os is so firm and dense and almost fibrous, that further dilatation is almost impossible without risk of tearing out the volsella with which the cervix is held. It is then simpler and safer to cut the internal os than to try and divulse it. The amount of incising which has to be done varies slightly in different cases. I usually make, with a blunt pointed bistoury, two lateral incisions about one-sixteenth to one-twelfth of an inch in depth, care being taken to cut only the internal os. After this procedure, dilatation is easily continued to No. 14 or 15, according to the size of the uterus being operated upon. In the earlier cases, I dilated to No. 17 or No. 20, but this is unnecessary and may be too much. I found that although the pain was removed, a few patients had excessive flow after this extreme dilatation, and my experience has shown me that pain is quite as satisfactorily relieved by dilatation to No. 14 or No. 15, which can usually be accomplished without splitting the external os. If No. 16 or a larger dilator is used, the external os almost invariably begins to split, and I always stop the dilatation now before this occurs. As the uteri vary in size, this gives a fairly good indication when dilatation has been sufficiently carried out. Dilators of the Goodell-Ellinger type are useless for this operation, and one should always use graduated, solid dilators, so that the exact amount of dilatation may be known. Practically none of these uteri requires curettment, and I think it is a mistake to curette. If the cervix is eroded, it is lightly cauterized with a Paquelin or electric cautery; the interior of the uterus is wiped out with iodoform gauze wrapped around a curette and immediately packed *firmly* with iodoform gauze, right out to the external os. The gauze is left long, lying in the vagina, to facilitate its removal on the eighth day. The operation is often carried out under gas and oxygen anesthesia, but sometimes gas and ether are required. Asepsis is *imperative*, particular care being taken in packing the uterus, not to allow the gauze to drag over the vulva. In none of the operations I have performed, have I had ill effects either primarily or secondarily.

In order to satisfy myself that the risk of infection is not a bar to the operation, I have, in many cases, had the gauze examined bac-

teriologically, after its removal. In most cases the gauze from the interior of the uterus is sterile, but in some, staphylococci, colon bacilli, streptococci and other organisms have been found. In no case in which bacteriologic examination has demonstrated these organisms, has there been any clinical evidence of their presence. There is usually a rise of temperature to about 99.6° or 100.2° on the second day, but this generally falls after a purgative has been given. In one case only have I had a rise of temperature which caused any anxiety. In this case the temperature rose to 102.4° on the second day, but as the patient was suffering from bronchitis, the gauze was not removed until the eighth day and no ill effects resulted. On three occasions in the early days, the incision of the internal os was made too deep, and very severe hemorrhage for a minute or two resulted, but in each case it was quickly controlled by passing a catgut suture well up in the fornix along the side of the uterus. Most of the patients have considerable pain for one or two days, the pain being of the same type as that from which they suffered at menstruation. It is usually relieved by the administration of aspirin and codeine but occasionally a hypodermic of $1/6$ gr. of morphine is necessary. I do not think that this operation can be done with impunity, but in the hands of those accustomed to operating, it ought to be as safe as an ordinary dilatation and curettage. The patient should be as carefully prepared as for a major operation, and the operation should always be done under the most rigid surgical technic.

Many of the patients have since borne children, and in no case has there been any trouble due to the previous operation; in fact most of the labors have been reported as being easy, the cervix rapidly dilating and no tear resulting. A few women have reported that at their first or later pregnancies, they have aborted, but as far as I am able to learn, no greater proportion of abortions has occurred after operation than occurs in women who have not been operated upon. My records show that I have employed the method 230 times, and I have sent out questionnaires in order that I might have accurate results to report. As the operations extend over a period of thirteen years, a considerable number have been lost track of. I have been able to keep in touch with 175 cases, and of these 138 have been either completely cured or markedly relieved, menstruation often coming on without the patient being conscious of it.

Twenty-nine cases have been partially relieved. These patients, although still suffering some pain or discomfort are able to "carry on" with or without the use of the simple measures of medical relief, and do not need to go to bed. In eight cases there has been no relief; the patients express themselves as being no better. In two cases I have performed the operation a second time. One was an

early case, in which the cutting of the internal os and the packing of the uterus was not satisfactorily carried out. This patient has been permanently relieved by the second operation. In the second case, the patient was relieved for about eighteen months, when her pains recurred. The second operation has resulted in relief although she is not completely cured. The ages of the patients vary from 15 to 42 years. Of those operated upon, 117 were unmarried. In several cases the operation has been done at the same time as some other operative procedure, such as the removal of an ovarian cyst or an operation for retrodisplacement, a myomectomy or the removal of a chronic appendix. It is interesting to note that in two cases, a retroverted uterus had been corrected without incision of the os, with no relief of dysmenorrhea. Both of these patients were completely cured by subsequent dilatation and incision of the internal os. In a few other cases the dysmenorrhea has been associated with retroversion of the uterus, and although the retroversion was let alone, the patients were completely cured of dysmenorrhea.

Among those upon whom I have done this operation, there is a greater proportion of grateful patients than from any other operation which I perform. I recommend it for disabling cases and cases which are severe enough to require alcohol or opiates to obtain relief. It will cure or relieve practically all young women who are otherwise in good health and who look forward with dread to the recurrence of their pain each month. It is applicable to all types of essential dysmenorrhea, whether they are classified as congenital, congestive, ovarian, uterine, obstructive, neuralgic, vagotonic, spasmodic or what not. Naturally, it should be used with caution where the painful menstruation is only one symptom of an unbalanced, nervous mechanism or where some psychoneurosis is present and should be performed with as great care as if it were a major procedure. Leaving the realm of speculation, the practical gynecologist must, until further light is thrown on the subject, proceed to make use of what knowledge he has, and apply it as scientifically as possible to relieve suffering.

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VAGINOSCOPY IN THE TREATMENT OF GONORRHEAL INFECTION OF THE LOWER GENITAL TRACT IN INFANTS AND YOUNG GIRLS

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THE diagnosis, treatment and determination of cure of gonorrheal infection of the lower genital tract in the female child is an ever present problem. Irving Stein¹ has shown the lack of unity among physicians on all three of these points. Aside from these factors the doctor is constantly confronted with the matter of proper control of the patients unless he be so fortunate as to be able to hospitalize them. The material of this clinic is drawn from the whole state of Iowa, the children being committed under the Perkins Act, which permits of hospital care and complete control of the case during the treatment and for follow-up observation, the latter in conjunction with the Social Service Department. Even under these favorable conditions the infection is often stubbornly resistant to the measures ordinarily employed in the treatment, which consists essentially of the following: (1) Douches, either internal or external, or both, depending on the extent of the infection.² (2) The above, combined with instillations into the vagina and urethra of solutions of gonocides and topical applications to the perineum. (3) The injection of a suspension of medication in paste form into the vagina.³ (4) The use of oily Dakin's solution.⁴ (5) With any of the above methods an examination of the vaginal canal by means of an endoscope before making a determination of cure.⁵

The medication used is by no means constant nor is the technic of application the same. In a fairly comprehensive review of the literature one is impressed with the fact that it is not so much what is used in the treatment but *how* the treatment is carried out. In this clinic, prior to July, 1922, numerous drugs were employed with about equal success. At that time Mercurochrome 220 (H. W. & D.) was adopted as an efficient gonocide and the best method of application worked upon.

The technic at that time consisted in douches twice a day of 1:10,000 potassium permanganate, eight quarts at a temperature of 110° F., given under low pressure and continued for ten to fifteen minutes. In cases of acute vulvitis this was limited to the external genitalia and strict cleanliness (as is the rule in all cases) observed. Where there was a demonstrable vaginitis, as soon as the acute stage had subsided these douches were given internally. In additions to the douches the patients received, once a day, six days a week, local applications. A wire speculum was inserted, the vagina dried by means of cotton pledgets and a small pack soaked with the medication inserted and left for six hours. The urethra was treated with topical applications as were the anus and ducts of Bartholin's glands.

Under this regime the majority of children responded to treatment but there remained a few patients who were resistant to this method. It was with the hope of being able to demonstrate an untreated, or poorly treated locus of infection that these patients were examined by the following methods:

The child was placed in the knee-chest position and draped with a small cystoscopy sheet. The anal region was observed for possible involvement, Bartholin's glands palpated and their ducts inspected and the urethra examined. Then, using a No. 26 Koch model urethroscope the entire vaginal tract was carefully gone over and the cervix examined. Smears were taken from the urethra, anal region, vaginal mucous membrane, Bartholin's ducts and the cervical os. These were taken in duplicate, checked by two different workers and in the event of an uncertain diagnosis, repeated. These were stained by Gram's method, methylene blue being deemed very unsatisfactory stain for smears from the female genital tract. In taking the films cotton covered applicators were not used as it was felt that the information gained from such smears was unreliable, first, because much of the secretion was absorbed by the cotton, and secondly, even with careful swabbing the pus cells were broken up and the resulting film showed what might be considered typical organisms were they not extracellular or in a disintegrated cell mass. The applicators were then tried after moistening them with bichloride of mercury but these again were not entirely satisfactory. An ordinary medicine dropper was heated over a flame and the tip pulled out into a capillary tube of sufficient length to enable us to take a cervical film through the endoscope. Using this tube and a drop or two of normal saline an emulsion was made of the secretion which was blown out on the slide and made a very satisfactory film. A platinum loop was also used with good results.

The findings were then tabulated as the case was followed through, and the results are shown in Table I.

The ages of these children vary from 16 months to 11 years.

The source of infection, as nearly as could be determined from the relative or escort which brought the child, was innocent or accidental in all but one, number three being the result of rape.

Ten of the children had had previous treatment by us for the infec-

tion, the longest over a period of 184 days and the shortest 16. In the latter instance the child was referred to this clinic because of stubborn infection and lack of co-operation. This child and two others, Cases 5 and 9, had been treated prior to their admission to our ward.

All of the patients had positive smears on the date of first examination, from the vaginal discharge.

Previous observation of two of the girls had demonstrated maculae of Bartholin's ducts, another showed a proctitis and urethritis was demonstrated in all but two. These lesions had subsided under treatment and therefore could not be held responsible for the persistence of the disease.

The local lesions were all confined to the upper third of the vaginal tract and cervix. Vaginal erosions occurred four times and erosions of the vaginal portion of the cervix four times. The cervix was definitely patulous in three cases. Caruncular hypertrophy of the endocervix was seen twice. Definite endocervical discharge could be demonstrated three times.

The vaginal erosions were small areas which appeared to represent a superficial loss of epithelium with a reddened base covered with purulent secretion. Two patients which presented these erosions also had an endocervicitis with the eroded area directly below the external os, seemingly due to the irritating cervical discharge pouring out on the mucosa.

Erosions of the vaginal portion of the cervix was associated once with definite endocervical disease but in the other three there could be demonstrated no endocervicitis. One of these, Case II, was spastic and very difficult to treat and showed a line of demarcation in the upper third of the vagina between normal appearing membrane and a much reddened fornix with cervical erosions, showing that treatment had not reached this area. The employment of the endoscope in this instance facilitated thorough application materially.

Three patients presented patulous cervices, two being accompanied by demonstrable disease of the endocervix, but the other, Case 9, showed no gross changes in the lining of the cervical canal.

Cases 1 and 2 are of particular interest. Here the external os was patent with considerable purulent material coming from the canal. On the posterior wall of the endocervix was a reddened area about the size of a small pea which appeared much like a urethral caruncle, fiery red. Apparently this lesion corresponds to the "erosion" (ectropion) found in the chronic endocervicitis in the adult. Case 1 is of further interest because of the diagnosis of gonorrheal salpingitis in a girl of five. The history revealed that she had complained of soreness and occasional sharp pain over both lower quadrants previous to admission, hence we have reason to believe that the tubal infection was there before treatment was undertaken and that manipulation did not cause extension upward. Further this has never happened in any of the children under treatment. The diagnosis was made after carefully ruling out other conditions, realizing that this complication of gonorrhea in a person of this age is rare. The perineum showed no evidence of involvement and a carefully made rectal examination caused no discomfort until pressure was made over the tubal

TABLE I

NO.	AGE	HOUSE NO.	DURATION OF DISEASE PRIOR TO EXAM	FILM ON EXAM	LOCAL LESIONS	COMPLICATIONS	DURATION OF TREATMENT FOLLOWING EXAM	SIX WEEKS FOLLOW-UP EXAMINATION	FOURTEEN WEEKS FOLLOW-UP EXAMINATIONS	REMARKS
1 G.S.	2	51451	149 in days	+	Endocervicitis Patulous cervix Cervical "Caruncle"	None	33	No local lesions Cervix patulous and clean No discharge Film negative	Same as six weeks Examination	Infected in an epidemic
2 A.S.	5	51763	88	+	Cervical erosions Patulous cervix Cervical "Caruncle" Endocervicitis Vaginal erosions	Salpingitis	37	No local lesions Cervix clean No discharge Film negative	Same as six weeks Examination	History of abdominal pain before admission
3 D.D.	11	53130	16	+	Endocervicitis Vaginal erosions	None	63	Report from local M.D. Smear negative No clinical evidence	Moved from State	
4 H.S.	5	53005	82	+	None	None	31	Negative Film negative	Same as six weeks Examination	Infected from Aunt. Sister also diseased
5 L.D.	7	52674	39	+	Cervical erosions	None	42	No local lesions No discharge Film negative	Slight vaginal discharge Film negative	
6 D.R.	16 mos	52540	43	+	Vaginal erosions	Inguinal Adenitis	51	Report from local M.D. Film negative No clinical evidence	Same as six weeks Report	Infected from Mother
7 V.B.	1	47009	184	+	Vaginitis	None	37	Slight vaginal discharge No local lesions Film negative	No vaginal discharge No local lesions Film negative	Infected from Mother
8 S.S.	9	53004	82	+	Cervical erosions Patulous cervix	None	31	Cervix patulous No discharge No local lesions Film negative	Same as six weeks Examination	Infected from Aunt. Sister also diseased

TABLE I—CONT'D

9 G.B.	7	52124	60	+	Vaginal erosions	None	41	No local lesions No discharge Film negative	Same as six weeks Examination	
10 J.W.	8	50307	123	+	Vaginitis	None	36	Slight vaginal discharge No local lesions Film negative	No local lesions No discharge Film negative	
11 W.D.	3	52625	102	+	Cervical erosions	None	31	Right Bartho'in g'and duct inflamed from the duct Pus draining from the duct Typical organisms dem- onstrated in film Anal region negative— Cervix patu'ous		

region. This caused the child to cry out with pain from palpation on either side. The tubes could be distinctly felt and traced from the uterus toward the pelvic wall where the tenderness was the greatest.

The complications in this small series are few. Aside from the salpingitis there being only one, Case 6 which had an inguinal adenitis which did not suppurate and receded under appropriate treatment.

Subsequent Treatment and Management.—The child was placed in the knee-chest position, a small nasal speculum introduced, the vagina ballooning out with air, and the canal dried as thoroughly as possible with cotton pledgets. The endoscope was then inserted and invariably the fornices would be found moist. With this instrument in place cotton pledgets absorbed the secretion in the upper third of the vagina. A stream of warm air was then played over the entire tract, including the introitus for ten to fifteen minutes until the epithelium presented a glazed appearance. The Mercurochrome was then painted over the mucosa and the child put to bed in the Sims position for an hour. Vaginal, cervical and endocervical lesions when present were treated twice a week with a 5 per cent solution of silver nitrate. The above was supplemented with douches twice a day of potassium permanganate 1:10,000, 110° F., using about eight quarts of fluid under low pressure for fifteen minutes. This regime was carried out six days a week, no treatment on Sunday and on Monday morning before any treatment had been given, the films were made. When a negative film, together with definite clinical improvement, was obtained, the case was given local applications three times a week. If, under this management, the films continued negative and clinically good progress was noted for three weeks, treatment was suspended entirely and the child observed for ten days, taking films every other day. Following this the patient was dismissed for six weeks under supervision of the Social Service and care of the doctor referring the case. At the end of this time they returned for two days of observation, and if again found to be negative they were returned home with instructions to report in eight weeks, standing orders being that at any time symptoms were noted the child was to be returned to us.

The average duration of treatment of these eleven cases following the institution of the above regime was 39.3 days, longest 63 and shortest 31 (which was the shortest possible time if we were to live up to the above rule).

The results of the follow up are shown on the Table.

Case 7 was returned to us from an institution because of positive smears taken the day the child was returned to them. No treatment was given on readmission and daily films were taken in duplicate and gone over very carefully by several different workers. No gram-negative intracellular diplococci were found at any time. Very slight vaginal secretion was evident, the films showing many epithelial cells and extracellular organisms which occasionally stained gram negative and were proved culturally to be staphylococci.

Patient 11. returned eight weeks after the initial dismissal with a palpable right Bartholin gland which on pressure yielded pus from the duct, film showing typical gonococci. Moderate vaginal discharge was present, no erosions found in the vagina or vaginal portion of the cervix and no discharge evident from the cervix. Films from all other sources in the genital tract, the urethra and anus failed to show gonococci. The social service reported the home conditions as "filthy" and the child's hygiene was obviously much neglected judging from her condition on return to us. The possibility of reinfection is to be considered here, particularly as the rest of the genital tract showed no evidence of the disease.

CONCLUSIONS

1. Eleven children with intractable gonorrheal infection of the lower genital tract are reported in which positive films were found after clinical examination by the ordinary methods could not demonstrate a cause for the persistence of the infection.
2. Vaginoscopy revealed definite cervical disease in five patients, two of whom presented ectropion of the endocervix.
3. Systematic treatment of these lesions controlled the infection in all but one, which presented an acute Bartholin gland on return.
4. As brought out by Norris and Mikelberg, the term "vulvovaginitis" does not cover the extent of infection in many cases of gonorrheal infection in the lower genital tract in female infants.
5. Evidently the choice of medication is not of as much value as the selection of the treatment method.

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AN OVARIAN CYST OF UNUSUAL SIZE REMOVED UNDER LOCAL ANESTHESIA

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A WHITE married woman of forty-nine years entered the New Haven Hospital on March 31st, 1922, with a complaint of "dropsy."

Her illness dated from the menopause, five years previously, when a gradual diffuse abdominal distention began. No associated symptoms occurred until one year before admission when there were mild transient attacks of palpitation and of dyspnea, and a slightly increased urinary output. Except for a tendency toward constipation, there were no symptoms referable to the gastrointestinal tract. The patient was employed as a factory worker until the month prior to admission, at which time a sudden increase in the size of the abdomen and of the lower extremities forced her to stop work. During the last week of this period, the legs were said to exude a foul smelling fluid.

The personal and family history were entirely negative. The menses had always been normal, and the one pregnancy, twenty-six years before, resulted in a difficult full-term delivery. There had been no previous operations or serious illnesses.

Upon the first examination, the temperature was 97°, pulse 115, and the respiratory rate 28. There was a notable degree of emaciation, but the positive findings upon physical examination were largely limited to the thorax and abdomen. The chest was distinctly asymmetrical, bulging on the right side anteriorly, and on the left, posteriorly, while there was a distinct vertical shortening from the upward pres-

sure of an abdominal tumor. There were many distended veins in the anterior thoracic wall, and these evidently drained into a large vessel in the first intercostal space near the left sternal border. The dorsal spine showed a lateral curvature but no signs of intrinsic disease.

The heart sounds were clear, but slightly diminished in intensity, and an occasional extrasystole could be made out. Breathing was accelerated but there were no râles.

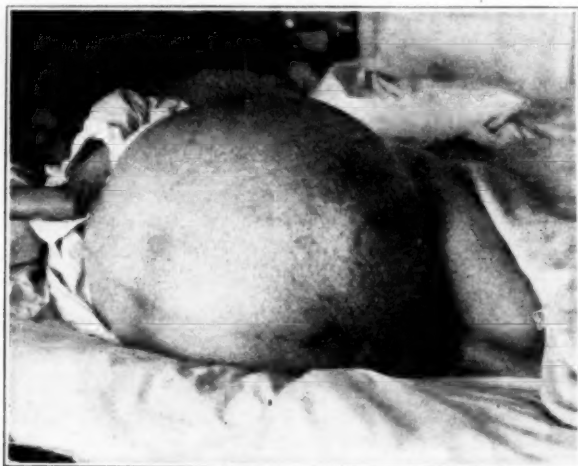


Fig. 1.—Anterior aspect of abdominal wall. Note the striking difference in the character of the skin above and below the umbilicus. The emaciation of the arms contrasted with the edematous thighs is notable. The size of the tumor is better appreciated by the fact that two beds side by side were requisite for the patient's comfort.



Fig. 2.—The symmetrical and regular outline of the abdomen is here demonstrable but the size is relatively diminished by a lateral flattening.

Complete blood counts were within normal limits except for a leucocytosis of 11,200 and the Wassermann reaction proved negative.

The abdomen showed an extreme degree of distention, roughly oval in shape and measuring 109 cm. laterally from the bed margins (Fig. 1). The vertical dimension from xiphoid to symphysis was 98 cm. (Fig. 2). The tumor was elastic in consistency and neither tenderness nor pulsation could be demonstrated. A distinct fluid wave was felt in all areas, but because of the patient's inability to

move, shifting dulness could not be determined. The percussion note was everywhere dull except over a narrow longitudinal area on the left side, where the tympany of the descending colon was present. The skin of the abdomen presented the shiny appearance characteristic of overstretching, and in the upper half there were many large, tortuous veins, continuous with the superficial thoracic vessels described. The skin below the umbilicus was thickened, edematous, and corrugated.

The upper extremities showed marked emaciation and muscular atrophy, but the legs were extremely swollen and reddened, with many small abrasions, from which a serous fluid was exuded. The ankles, feet, and toes were included in the diffuse edematous reaction.

Pelvic examination revealed that the surface of the lower pole of the tumor was multinodular. The renal function test with phenolsulphonphthalein showed an output of forty per cent in two hours. Barium enemata were negative to radiographic examination.



Fig. 3.—Five weeks after operation, the abdomen has resumed the normal contour, and the redundant skin is easily kept in place by small adhesive strips.

A tentative diagnosis of an ovarian cyst was made, and after several days of observation and study, an exploratory incision through the lower left rectus was performed under novocaine anesthesia. The cyst wall was found adherent at this point to the parietal peritoneum. Through a small opening a clear straw-colored fluid escaped and during the next half hour forty liters of fluid were removed with but little perceptible diminution in the size of the tumor. The tentative diagnosis having been confirmed, a radical operation at an early date was decided upon.

Through Dakin tubes sutured into the incision, twenty-six more liters of fluid drained away during the succeeding twenty-four hours. A preliminary analysis of this fluid showed a neutral reaction, a specific gravity of 1.012, a heavy cloud of albumin; and upon microscopic examination many cholesterol crystals and degenerated polymorphonuclear leucocytes were seen.

Approximately three weeks later, the radical operation was performed. The

abdominal wall was infiltrated with 0.5 per cent novocaine along a line extending from the left inguinal ligament to the corresponding costal margin. Following the ligation or the digital separation of adhesions, the tumor, which had its origin in the left ovary, was delivered intact through the incision. The pedicle was divided and all bleeding points were secured in the usual way.

Saline solution was poured into the abdominal cavity, and the incision was sutured without resection of the redundant parietal wall. A firm pressure bandage was applied as a prophylactic measure against the development of paralytic ileus. The patient left the operating room in good condition, the blood pressure having dropped from 125 to 90, systolic, and the pulse having risen from 110 to 145 in a period of one hour and forty minutes.

The postoperative course was notably free of complications. The patient sat up on the tenth day, was allowed out of bed two days later, and within two weeks the wound had completely healed (Fig. 3). Thirty days after operation the patient



Fig. 4.—Section through the cyst wall including several daughter cysts. The epithelial lining of the larger cyst is flattened as a result of pressure. The lining cells of the smaller cysts are of the high columnar type with the nucleus at the base of the cell.

was discharged in excellent condition, except for the laxity of the abdominal wall, which was secured by adhesive straps.

Subsequent examination of the tumor revealed a multilocular ovarian cyst weighing sixty-seven pounds, which measured $128 \times 108 \times 35$ centimeters on a flat surface. A thinned-out fallopian tube thirty-five centimeters in length traversed the lower and posterior aspect. Several daughter cysts, measuring one to seven centimeters in diameter, were visible at one point. The contents of these smaller sacs were of gelatinous consistency, and abundant in cholesterol.

Upon section the cyst wall varied from one to three millimeters in thickness, and at certain points calcified plaques were demonstrable. Histological sections, taken through the thicker portion of the wall (Fig. 4) showed a predominance of fibrous tissue with an occasional strand of muscle. The epithelial cells lining the larger cysts were somewhat flattened as a result of pressure. Those of the smaller

daughter cysts were of the high columnar type with the nucleus at the base of the cell. At numerous points beaker cells were demonstrable.

The cyst contained fifty-seven liters of fluid. A chemical analysis by Dr. Robert Kapsinow gave the following results per 1000 c.c.

Color	Cloudy amber	Creatinine	None present
Sp. Gr.	1.025	Creatin	None present
Reaction	Distinctly alkaline	Sugar	None present
H ₂ O	95.4 - 95.7%	Chlorides	66.7 grams
Solids	4.3 - 4.6%	P ₂ O ₅	5.0 grams
Ash3 - .9%	SO ₄	3.2 grams
Organic matter	3.7 - 4.0%	Cholesterol	Trace
Total	6.12 grams	Cholesterol Esters	Trace

It is interesting to note that the forty liters of fluid removed at the preliminary operation plus the twenty-six liters which drained away subsequently and the fifty-seven liters removed with the intact cyst at the time of the later operation, represent a total fluid production of one hundred and twenty-three liters. This total no doubt was secreted over a considerable period of time, but from the figures the tendency toward rapid accumulation over a short period under favorable conditions is evident.

The literature upon ovarian tumors is most comprehensive, and many excellent texts by experienced writers are available. Furthermore, these lesions and the results of their treatment are frequently so striking and spectacular that the subject abounds in case reports of varied interest and significance. On that account data relating to additional cases are justified only when they render a distinct contribution to the subject, or represent a definite epoch in its development. This case represents a common type of tumor, much smaller than many heretofore reported, but so far as we can find, is the largest tumor of its kind removed intact under local anesthesia. Although not universally applicable, this case demonstrates the value of the method in selected instances where the general condition of the patient contraindicates the administration of a general anesthetic.

AN IMPROVED HEAD STETHOSCOPE FOR THE HEARING AND COUNTING OF FETAL HEART TONES

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THE use of the head stethoscope for the hearing and counting of fetal heart tones dates back to March, 1917, when Hillis¹ published his description of the first instrument of this kind. The advantage claimed for this instrument was that the obstetrician could listen to the fetal heart tones repeatedly while wearing sterile gown and gloves without contaminating his hands by adjusting a stethoscope or being forced to rely on second hand information as to the rate and character of the fetal pulse obtained by an assistant.

Shortly after this instrument was devised it was modified by De Lee² slightly and an attachment was made for the clocks in the delivery rooms of the Chicago Lying-In Hospital which rang a bell every fifteen seconds loud enough so that it could be heard by the obstetrician when the head stethoscope was adjusted and the heart tones being counted.

In this way the rate of the heart tones could be accurately determined without observing a watch as is ordinarily done when taking the pulse.

There are several objections to this method of timing the fetal heart beat. First, the clocks are rather expensive and cannot therefore be installed in all delivery rooms. Secondly, they are mechanically imperfect and not infrequently get out of order. Thirdly, their use is somewhat restricted by other noises in the room and this is especially true when the patient is noisy in the second stage. Fourthly, it cannot be used in the patient's home or in the delivery room not provided with the special bell-ringing device.

Some of these objections can be obviated by calling in the services of a second party who counts the movements of the obstetrician's finger as he beats time while listening to the fetal heart for a quarter or a half minute. The information as to the fetal rate is then relayed to him.

Since undertaking the amplifying of the fetal heart tones by means of the microphonic stethoscope we have become interested as well in the improvement of the ordinary head stethoscope. It is obvious that even with successful amplifying instruments that relatively few delivery rooms will be equipped with this apparatus for some time to come.

Therefore, a transportable instrument that could be worn while operating, which would give the obstetrician accurate first hand information concerning the rate and quality of the fetal heart would be very desirable.

After some experimentation we have devised two types of instruments which we believe overcome the objectionable features of the ordinary head stethoscope mentioned above. In developing the first instrument we took a head stethoscope of the ordinary spring steel type and mounted a stop watch in the middle of the longitudinal band which fits over the crown of the head. At the posterior extremity of this band we mounted a small flash-light cell. We then placed a small flash-light bulb just posterior to the transmitter bell of the instrument so that it was just above the level of the eyes when the stethoscope was adjusted for use.

We then bored through the crystal of the stop watch and passed a fine copper wire connected with the above-mentioned battery through the hole in such a way that contact was made with the hand of the watch when running. In this way contact was made by the alternate ends of the hand of the watch every fifteen seconds. The contact closed the circuit and caused the flash-light to light up for about a second.

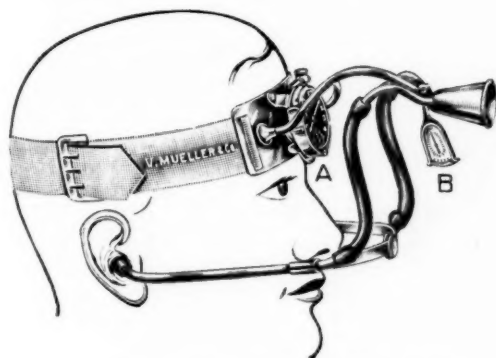


Fig. 1.—A, Watch; B, magnifying mirror.

Since a stop watch of the nonmagnetic type was used no difficulty was encountered in having a current flow through the watch.

The obstetrician has, therefore, merely to adjust his stethoscope, set the watch going, start counting with the first flash and stop with the second in order to get the rate for a quarter minute. The watch will run for several hours and the amount of current used is negligible.

The results obtained with this instrument have been perfectly satisfactory, but because of the complexity of the connections and the possibility of various parts getting out of order, a second instrument was devised.

The second type of instrument depends on an entirely different principle. We took an ordinary pocket watch with a sweep second hand and attached it by a special holding bracket to the head stethoscope so that it rested just above the root of the nose when the head stethoscope was adjusted for use. A magnifying mirror was then mounted on a ball and socket joint clamped to the horizontal bar that supports

the bell of the stethoscope. The mirror was so placed that by slight adjustment a perfect image of the watch dial was obtained without straining the eyes. We found by using the mirror in this manner that we doubled the focal distance and therefore increased the ability of the eye to accommodate comfortably. When the watch was placed in the position of the mirror it was found that this focal distance was too short for the average eye.

The image revealed in the mirror is of course reversed but this interferes in no way with the counting of quarter minutes, and with a little practice there is no difficulty in telling the time if allowance is made for the mirror image.

As an added advantage the watch has a luminous dial and hands so that the fetal heart tones can be counted by the use of this instrument in a darkened room if for any reason this is desirable.

The advantage of this instrument is its simplicity, as there is practically nothing about it that can get out of order. It provides the physician with accurate information as to the length of time consumed by any given maneuver or stage of labor. For example in a breech delivery, the physician can keep track of the time elapsing between the birth of the umbilicus and the completion of the second stage. During an operative delivery, manual dilatation of the cervix, the operator has constantly before him the time taken to dilate.

The advantages claimed for these instruments are:

1. They can be easily transported and used in the home and ordinary hospitals.
2. They can be used no matter how much noise there is in the room provided the fetal heart tones can be heard.
3. The obstetrician can get first hand information regarding the fetal heart rate.
4. With the second type of instrument the physician has constantly before him the accurate information as to the length of time consumed by any stage of labor or operative procedure.

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SIX CASES OF PUERPERAL INFECTION*

BY JOSHUA RONSHEIM, M.D., BROOKLYN, N. Y.

IN reporting the following cases of postpartum pelvic infection it is my intention to show that these infections are of various distinct types and may be classified as follows:

1. Endometritis,—the infection remains limited to the mucosa of the genital tract.

2. Bacteremia,—the infective organism invades the blood stream. This may be (a) directly from the placental site, or (b) secondarily from a thrombophlebitis of the pelvic veins.

3. Parametritis,—the infection spreads through the lymphatics into the parametrial tissues. A less common variety of this type is the lymphatic peritonitis.

4. Pelvic thrombophlebitis,—the infection spreads through the pelvic veins.

5. Pyosalpinx and its associated conditions, in which the infection spreads through the tubes. This type is almost invariably gonorrheal.

6. Phlegmasia alba dolens. Whether this condition is produced by an exudate in the pelvis compressing the lymphatics or whether the lymphatics forming a network around the pelvic veins are compressed by an endophlebitis of these veins is not definitely understood. Nevertheless, the diffuse white swelling of the thigh resulting from lymph stasis is a definite clinical picture.

CASE 1.—*Bacteremia by direct invasion from the placental site.* Mrs. K., a primipara, twenty-three years of age, entered my service at the Jewish Hospital on January 24, 1918, in labor. Labor terminated normally in about nine hours. A nick in the fourchette was closed with one plain catgut stitch. About 36 hours after delivery her temperature rose to 101°, and, the following morning, 48 hours after delivery, she had a chill with elevation of temperature to 103.6°. Her only complaint was of slight pain in the middle of the lower abdomen; examination showed nothing but a tender uterus. Lochia was scant. For the next 72 hours there was a gradual lowering of her temperature, then an elevation to 104° and a few hours later, following a severe chill, to 106°. Blood culture showed a streptococcus hemolyticus. Death occurred on February 4.

This is a case of septic endometritis, then invasion of the placental site as shown by the first chill, then an incubation period, finally overwhelming invasion of the blood stream.

CASE 2.—*Bacteremia following thrombophlebitis.* Mrs. S., twenty-eight years of age was admitted to my service at the Jewish Hospital at 3:45 A. M., January 31, 1923, in the third stage of her first labor. She had had a spontaneous delivery three

*Abstract of paper on "Pelvic Infections in the Puerperium," read before the Williamsburg Medical Society, Oct. 15, 1923.

hours previously; the membranes had ruptured spontaneously several days before the onset of labor. Twenty minutes after delivery, and at various times thereafter, unsuccessful attempts were made to express and extract the placenta. During all this time the patient was steadily bleeding. On admission the vulva was unshaved and the cord was protruding; uterus flabby with the fundus in the right hypochondrium; no external bleeding at this time. Heart sounds were feeble, pulse rapid and of very poor quality, respirations slow and shallow. Skin and mucous membranes showed a marked pallor and the patient constantly begged for water. She was placed in the Trendelenburg position and covered with warm blankets. The vulva was shaved and under careful asepsis the placenta was extracted manually. One c.c. of pituitrin was given hypodermically and this, coupled with manipulation of the fundus, produced contraction of the uterus. As the husband's blood did not match and as no other donor was available at that time she was given a hypodermoclysis of 1000 c.c. saline solution. At 10:00 A. M. her condition was much improved,—TPR 99—88—20. At 2:00 P. M., February 2 her temperature rose to 103° and she complained of pain in the sacral region and occipital headache. Pulse 128, heart action good, lungs negative. The abdomen was soft, uterus well contracted and not tender; no tenderness in the flanks or iliac regions, thighs, or breasts. Lochia moderate red. On February 3 her condition was the same, her only complaint being the sacral pain; her temperature was lower. At 1:00 A. M., February 4 she had her first chill with elevation of temperature to 104.8°. Blood culture was taken. Careful examination failed to reveal anything abnormal. RBC was 2,400,000; hb 45 per cent; WBC 9,200 with polys 78 per cent. Blood culture shows a streptococcus non-hemolyticus. Her condition continued the same with repeated chills and temperature ranging from normal to 106° until February 11 when her chills ceased, her temperature remained steadily high and simultaneously the laboratory reported that the blood now showed a streptococcus hemolyticus. She died on the morning of February 15.

This was a case of thrombophlebitis of the pelvic veins in a patient whose resistance had been greatly lowered by hemorrhage. Subsequently disintegration of the thrombi produced a bacteremia with its changed picture.

CASE 3.—Parametritis. Mrs. B. S., twenty-one years of age, a primipara was seen in consultation on May 31, 1920. She had been in labor 40 hours. She had a dystocia due to disproportion, the pelvis being normal but the baby oversized. The cervix was three fingers dilated, the membranes intact, and a vertex riding at the brim. The baby was dead. On admission to the hospital at 4:00 P. M. she was morphinized, my intention being to await full dilatation and then perforate the vertex. The following afternoon she had increased the dilatation somewhat and, in spite of my expressed desire to let her alone, one of my staff delivered her by so-called manual dilatation and high forceps. The cervix was lacerated considerably and the perineum was lacerated to the sphincter ani. There was an immediate rise of temperature to 104.4° with pain in the lower abdomen and a gradual development of a mass in the parametrial tissues of the left side. On August 17, the seventy-seventh day postpartum the mass showed a softening and bulging in the left anterior fornix and the following morning this abscess was opened and drained. For a few days her temperature showed a tendency toward normal but on August 22, following the removal of the packing strips in the cavity the temperature again rose. From this time on her condition remained stationary and on September 1 she was sent home, where her treatment was continued. On September 29 another pus cavity was drained just in front of the cervix. This resulted in a little improvement, her temperature showing a tendency to remain lower than previously, although it still showed the decided remissions. On October 18, 139 days after delivery her condition was better than at any time previously, but it was found that her urine

was now practically pure pus. The diagnosis was evident, namely rupture of a pus cavity into the bladder. She gradually improved, gaining in weight and strength. Every now and then she would have an attack of pain in the pelvis with a rise of pulse and temperature coincident with the disappearance from the urine of practically all signs of pus; this would be followed by a sudden gushing of pus from the bladder, the disappearance of all pain and return of temperature to normal. Cystoscopic examination showed enormous edema of the mucosa of the fundus with innumerable small streams of pus coming through. As the treatment produced no satisfactory results the patient was persuaded to undergo operation, especially as a mass had again developed in the left side of the abdomen with a discharge of pus from the umbilicus. Accordingly, on April 5, 1921, she was re-admitted to the hospital and operation performed on April 7. On opening the abdomen the mass in the left side was found to be in the abdominal wall, being an exudate around a sinus leading to the umbilicus. The uterus was adherent to the bladder and anterior abdominal wall; the left tube and ovary were buried in dense adhesions with marked thickening of the left broad ligament; adhesions of the right tube and ovary also but less marked. A supracervical hysterectomy was done including both tubes and ovaries; the umbilicus and its granulating sinus were excised. A rubber drain was placed in the culdesac and out through the lower angle of the wound. All the urine now drained through the abdominal wound until April 10 when, following the removal of the drain, a permanent catheter was placed in the bladder. The wound healed rapidly; the catheter was removed six days later and the patient was discharged from the hospital on May 7 in excellent condition and urine normal. She has been seen on several occasions since, her only complaint being her weight.

This is a case of infection in the lymphatics of the parametrial tissues of the left broad ligament, the point of entrance probably being the laceration of the cervix, with formation of a pelvic exudate, subsequent pus formation in this exudate, and final rupture of a pus pocket into the bladder.

CASE 4.—*Thrombophlebitis*. E. R., twenty-two years of age, a primipara, was admitted to the Jewish Hospital December 3, 1922. She was pregnant six months with a complicating hyperthyroidism. Because of her condition it was decided to interrupt her pregnancy. It is, and was then, the writer's opinion that the only way to empty a uterus at six months of pregnancy is to perform an anterior vaginal hysterotomy, but in this case the patient's physician put forth an eloquent appeal in favor of nonoperative induction of labor. Accordingly, on the morning of December 7, the cervix being tightly closed, a strip of gauze was packed into the os and the vaginal canal tightly packed. December 8 the packing was removed and it was found that it was just possible to slip the smallest Voorhees bag through. December 9 the bag was removed, having produced little, if any, advancement in the dilatation. The uterus and vagina were now tightly packed with gauze. The following morning this packing was removed and the uterus completely emptied. Instead of a clean-cut operative procedure of thirty minutes' duration the patient was subjected to repeated intrauterine manipulation over a period of four days, the natural result of which is her subsequent course. On the afternoon before the final emptying of the uterus her temperature rose to 101.4°, but dropped with the complete evacuation of the uterine contents only to rise the next day. Her temperature now continued irregularly between 102° and 105° for ten days, during which time she complained of some pain in the lower abdomen. Examination revealed a tender, boggy uterus, otherwise the pelvis was negative. On the afternoon of December 20 she had a severe chill with elevation of temperature to 106.2°; every day thereafter until December 29 she had a severe chill with varying elevations and remissions of temperature. Following her chill on December 29 she complained

of excruciating pain in the left knee which soon became the seat of a marked effusion; the next day an alveolar abscess developed which was handled by the dental surgeon. Her condition now began to improve. On January 7, after two days of normal temperature she was thoughtlessly allowed out of bed; there was an almost immediate recurrence of temperature. During the next ten days the patient was desperately ill and on January 17 in an attempt to bolster up her failing vitality she was given a transfusion of 300 c.c. of unmodified blood. There was no reaction but on the morning of January 19 her temperature suddenly dropped to subnormal followed by a severe chill, elevation of temperature to 106.4° and severe pain in the right hip. Following this attack there was decided general improvement and her temperature slowly approached normal until January 25 when she again appeared ill, although she had no complaints; this period lasted eight days. Her temperature reached normal on February 2, and, excepting one forty-eight-hour rise about the middle of February, her recovery was rapid and uneventful. She was discharged March 3. Cultures of the blood and urine were repeatedly negative. Pelvic examination on December 14 and again on January 14 was negative.

This is a typical case of thrombophlebitis of the pelvic veins with scattered embolic processes.

CASE 5.—*Phlegmasia alba dolens*. B. B., age thirty-nine, para iii, was admitted to my service at the Jewish Hospital on April 2, 1921. The vagina was packed with gauze; this had been placed there by her physician following a severe hemorrhage. She was immediately prepared and under aseptic precautions the gauze was removed and a careful vaginal examination made. A central placenta previa was found with sufficient dilatation of the cervix to permit of a Braxton-Hicks version being done. Two hours later she expelled the baby stillborn. Four days postpartum she complained of severe pain in the vulva and left side of the pelvis. She continued to complain of this pain intermittently, also of an occasional pain in the left thigh. However, nothing unusual was found until April 23 when the pain became unbearable. The left thigh was now distinctly warmer than the right, although no swelling could be made out. By the 26 of April the thigh was enormously swollen, glossy white, and extremely painful and tender. Gradual improvement. Blood transfusion April 30. On May 6 she complained of severe pain in the vulva; the right labium was swollen and extremely tender; two days later the right thigh was involved. The pain was so intense as to require morphinization for days at a time. By the 11 of May her pain and swelling were markedly lessened and she was discharged on May 27. Pelvic examination early in July showed a pronounced thickening in the left broad ligament.

CASE 6.—G. T., age twenty-two, was delivered by me on June 11, 1912. Examination on July 12 showed a normal pelvis. During the latter part of her pregnancy her husband contracted a gonorrheal urethritis. On August 7, three days after their first indulgence in sexual relations, she came to the office suffering severe colicky pain in the left side of the lower abdomen with temperature of 102.8°. The night before she had had a slight amount of vaginal bleeding. Examination showed a typical tumor in the left side of the pelvis and smears from the cervix were reported positive. Under appropriate treatment she improved until August 27 when the attack was repeated on the right side. Her subsequent course was uneventful and she was discharged September 9. Examination six months later showed a normal pelvis.

A case of gonorrheal infection involving first the left tube and then the right tube with apparently no untoward results.

The differential diagnosis is usually not difficult. In septic endometritis, a chill and moderate elevation of temperature and pain in the region of the fundus; a large, boggy and tender uterus; profuse, bloody, and distinctly malodorous lochia (unless there be retention); and rapid improvement under appropriate treatment make the diagnosis clear.

The bacteremias are ushered in with a severe chill and rapid elevation of temperature. No further chills occur; the temperature remains uniformly high. The pulse is rapid and thready. Headache, extreme weakness, inability to sleep, euphoria, and mental confusion make up the picture and the laboratory confirms the diagnosis.

In the parametritis the onset is usually late, no distinct chill, moderate elevation of temperature, pain and tenderness on one side of the pelvis. Examination reveals a mass of varying size, usually limited to one side of the uterus, cervix and vagina in the pelvic connective tissues, the region of the bladder and culdesac are free. The mass is immobile, hard, somewhat tender, and is continuous with the uterus; the exudate broadens toward the pelvic wall in contradistinction to intraperitoneal tumors. Blood culture is sterile.

Thrombophlebitis is characterized by its violent onset, the chill being severe and lasting up to thirty minutes or even longer. The repeated chills, extreme variations in temperature, and the profuse sweats are characteristic. Pain is low down in the back. The pelvic examination is negative, as the condition is entirely within the veins. Later the embolic processes are typical. Blood cultures will usually give positive results if specimens of blood are taken at the time of the chill.

The gonorrheal tube is characterized by absence of chill, moderate temperature with remissions suggestive of pus, pain is of a colicky, sticking type. Vaginal examination reveals the typical tender sausage-shaped tumor. If pelvic abscess occurs the culdesac bulges, there may be retention of urine and feces, and the mass cannot be palpated above the pelvic brim.

Phlegmasia alba dolens is characterized by severe pain beginning in the labium of the affected side and spreading to the thigh. The edema of the thigh is pronounced, while edema of the leg is entirely absent or occurs later than in the thigh. It is a lymph stasis without transudation.

205 HICKS STREET.

A CASE OF UNILATERAL AMASTIA

By HENRY W. LOURIA, M.D., BROOKLYN, N. Y.

UNILATERAL amastia is one of the most uncommon of the numerous anomalies of the breast. As the extensive literature on diseases of the breast contains only a few reports of this rare condition, it seems worth while to describe this additional case.



Fig. 1.

The patient, aged twenty-five years, sought advice on account of a gastric complaint. The physical examination revealed a frail woman, 5 feet 2 inches in height, weighing 91 pounds. As the accompanying photograph (Fig. 1) shows, there is

a complete absence of the left breast and also of the pectoralis major and minor muscles, with the exception of those fibers of the pectoralis major which arise from the clavicle. A nipple is present in the fourth interspace of the left side, slightly external to the mid-clavicular line. The nipple measures about $\frac{3}{4}$ inch in diameter and resembles a male nipple in appearance. The right breast is of average size and slightly pendulous. Examination of the left axilla shows it to be devoid of hair, except along the outer wall, where there is a large tuft of coarse hair. Over those portions of the axilla which are free from hair, the skin is of delicate texture and has but few sebaceous and sweat glands. A careful inspection of the external genitalia showed no abnormalities. The uterus was normal in size and position. No abnormalities of the adnexa could be palpated.

On account of the close relationship between the mammary glands and the reproductive system, it is interesting to review the past history of this patient as concerns these structures. Her menstrual periods commenced at the age of thirteen and occurred at regular intervals of twenty-eight days. The average duration of her periods was four to five days and the flow was normal in character and amount. She was married at twenty-one, and 14 months later she gave birth to a normal child, which was delivered at full term after a normal labor. During the pregnancy the left nipple became darker in color and slightly tender, but there was no secretion. The patient nursed the child for a period of four months, and weaned the child at this time, because she was afraid that the breast milk might become exhausted. One year following the birth of this child, the patient became pregnant a second time and gave birth at term.

This case is of interest on account of the rarity of unilateral amastia. The associated absence of the pectoral muscles has been noted in practically all the reported cases of amastia. The preservation of the nipple is more frequent than the absence of the nipple. Absence of the mammary gland and the pectoral muscles is usually attributed to an arrested development of the mammary ridge and the underlying mesenchymal mass.

149 NEW YORK AVENUE.

Society Transactions

JOINT MEETING OF THE NEW YORK AND PHILADELPHIA OBSTETRICAL SOCIETIES

NEW YORK CITY, APRIL 8, 1924

The paper of the evening was read by DR. E. A. SCHUMANN, of Philadelphia, entitled **The Relation of Venereal Diseases to Childbirth.** (For original article see page 257.)

DISCUSSION

DR. A. H. MORSE.—We all will agree that gonorrheal infection is one of the most important causes of sterility, and that there are a few cases of puerperal infection which are due to the extension upward of the gonococcus. Moreover, the work of various investigators has shown that the pathological changes which occur in the lumen of the tube as the result of gonorrheal infection, form the greatest group of predisposing causes in tubal pregnancy. It is rather interesting that in discussing this question with a Californian now an assistant resident on my staff, I learned that gonorrhoeal infection is common among the Japanese women living in San Francisco and that tubal pregnancy occurs frequently.

I was much interested to hear Dr. Schumann speak of granuloma inguinale because we have had under treatment for the past year a colored woman with this lesion. As far as we could determine, she had never been out of New Haven, so apparently the infection was acquired in that vicinity. She had been once pregnant, but the infection occurred subsequent to the pregnancy. One who has seen the raw surfaces with the sanguineo-purulent discharge, must agree with Dr. Schumann that in the face of such a lesion delivery by cesarean section would be the procedure of choice. The patient in question was treated with tartar emetic intravenously and the lesion gradually improved, but she left town for a period, suffered a recurrence, and is now again in the hospital.

The opinions expressed by Dr. Schumann regarding syphilis are those which are generally held. Placentae showing the characteristic syphilitic lesions come to the laboratory much less frequently now than was the case ten or fifteen years ago. In New Haven, for example, we do not see now the number of syphilitic placentae which we formerly saw.

It has been strikingly shown that the intensive treatment makes it possible for a woman to give birth to healthy living children. There is a certain number of cases in which, while the Wassermann reaction is positive, the placenta fails to show any evidence of syphilis, but it has always been my feeling that positive findings in the placenta are of greater value in arriving at a diagnosis than is the Wassermann reaction by itself. Of course, in a large percentage of cases the placental findings and the Wassermann reaction agree.

I am glad that at the end of his paper Dr. Schumann spoke of the importance in prenatal work of determining the presence or absence of syphilis.

DR. A. C. BECK.—There are a few questions which occur to me in connection with the handling of these syphilitic cases in the prenatal clinic. In the first

place, we have to rely very largely upon the results of the Wassermann examination. We find in not a very small percentage of cases that a woman may have a strongly positive Wassermann during pregnancy and that it may disappear after the pregnancy, even though she has not had treatment. We, therefore, have to ask ourselves the question of whether we are justified in treating a patient vigorously for syphilis who has no other evidence of syphilis than a positive Wassermann. In our clinic we assume that these patients are syphilitic because we cannot differentiate and have treated all of them with salvarsan and have been criticised for it.

DR. MCGLYNN.—I have had perhaps a rather unusual experience with venereal diseases in pregnancy. At one hospital the majority of the obstetrical patients are of the illegitimate class. In about 650 cases, 288 showed positive smears for gonococci. In the majority of these cases the infection antedated the pregnancy. Unfortunately in this hospital we do not accept return cases, so that we have no way of following them up to know just what the ultimate results might be. We do know, however, from our experience, that it is a mistake to treat these cases during pregnancy. You only stir up the infection, and the patient instead of being benefited is apparently made worse.

Practically all these cases with the exception of six showed a decided septic type of fever during the puerperium. Many of them ran temperatures for three or four weeks, and yet were not sick. Every one of the 288 cases recovered.

DR. RALPH WALDO.—Is there any record of the paternal existence of syphilis in these cases?

DR. SCHUMANN (closing).—In regard to Dr. Waldo's question, I would say that I have records of a few cases where both mother and father were actively infected with syphilis. Those cases resulted almost invariably in the birth of dead macerated fetuses. Where both parents are actively infected at the time of conception, usually the fetus dies fairly early in the pregnancy.

In answer to Dr. Beck's query I should say that inasmuch as the Wassermann reaction is the only index we have as to the existence of syphilis, and inasmuch as we know that the modern treatment of this disease does not, if properly carried out, carry with it any danger to the woman, it would seem to be advisable (and this is done in my own practice) to treat the woman having a positive Wassermann as though she had syphilis.

NEW YORK ACADEMY OF MEDICINE

SECTION ON OBSTETRICS AND GYNECOLOGY

MEETING OF MARCH 25, 1924

DR. EDWIN W. HOLLADAY IN THE CHAIR

DR. JOHN F. McGRATH read a paper on **Inflammatory Disease of the Cervix Uteri**, a short abstract of which follows:

A general consideration of this subject is based on the study of more than 3000 consecutive gynecologic cases examined in the Cornell University Medical College Clinic. Cervical disease was present either as an entity or as an associated lesion in 64 per cent of these cases. Etiologically, pregnancy and its possibilities were the most common factors. Gonorrheal cervicitis is not to be considered as common as previously supposed. Pathologically its relation to pelvic inflammations and

puerperal sepsis was emphasized. Its prevention by better obstetrics, especially in regard to proper postpartal examinations and treatment, and the routine employment of a properly-fitted pessary was advocated, postpregnant observation extending over a period of at least six months.

Various methods of treatment were cited, preference being given to electro-cauterization, the proper application of which brought about complete cure in most cases, except those associated with other pelvic pathology requiring operative treatment. The conservative treatment with cauterization is often a most necessary preoperative preparation.

When operation is indicated the Schroeder technic, modified to suit the individual case, is to be preferred because by this method one can remove as much or as little tissue as the case demands and at the same time secure better apposition of mucous membrane than by any other technic.

A plea is made for more conservative treatment of cervical disease and less surgical mutilation with especial stress being laid upon the prophylaxis of cervical cancer by early treatment of cervical inflammation.

DISCUSSION

DR. THOMAS H. CHERRY.—I should like to ask Dr. McGrath whether he cauterizes a large area or takes small areas at one time. It seems to me that the cases in which extensive cauterization has been done at one or two treatments show severe reaction with a tendency to rather violent hemorrhage. The best results in my practice have been seen in cases in which small areas have been cauterized at a treatment, and repeated in two to three weeks for a period of several months.

In reference to postpartum treatment Dr. McGrath states that he makes an examination at the fourth week and if he finds a retroversion he inserts a pessary. This seems rather early to introduce a pessary, because one is likely to stretch the cervix and the vaginal vault, and then these structures are liable to remain stretched. It seems to me that for this treatment the seventh or eighth week is a little better time.

DR. EDWIN W. HOLLADAY.—I agree with Dr. Cherry that four weeks postpartum is a little early for a pessary. As a rule we apply this measure at about the sixth week. If a pessary is introduced too early it interferes with the circulation and retards involution. I use the cautery at the end of six weeks or two months and find that as a rule one application of the cautery is all that is necessary. I cauterize deeply and then allow about a month to pass before repeating the treatment. During this period we may use a little tamponing or iodine applications. If you can accomplish the desired results with only two treatments instead of four or five, I think that is an advantage, as it spares the patient the additional discomfort.

Where operation is indicated we use extensively the Sturmdorf operation, especially in older women in whom we are not so desirous of preserving the exact anatomy of the cervix.

DR. M. O. MAGID.—Dr. McGrath stated that he used a pessary four weeks after delivery in order to promote better involution and prevent retroversion, which favors chronic congestion, without telling us that the pessary is not indicated in cases of congenital retroversion of the uterus. There are many women who have congenital retroversion. I do not see what is to be gained by the use of a pessary in these cases. In these women, having congenital retroversion, we never meet with success when we try to correct the retroversion by use of a pessary. Should they become pregnant, we find after involution is complete, that they have the uterus retroverted just as it was before they became pregnant. Dr. McGrath

enumerated the various drugs that are being used and also spoke of Strobell's treatment of endocervicitis with caustic. When Dr. Strobell read his paper, I asked him to tell us whether he had heard of any patient of his series of cases that had been delivered, but he could not give us this information. It seems to me that we follow a wrong principle to recommend a method of treatment when those who have originally advocated that method cannot give us important facts; i.e., end-results. It is wrong because many young men who take up this specialty often use these new methods of treatment to the detriment of the patient. As to the use of the cautery, if one stops to think, he will realize that in putting the cautery needle into any tissue, he always burns and traumatizes the tissue for some distance away, along the tract made by the needle. I do not see how such treatments can leave the cervix in a normal condition. Scar tissue is the inevitable result, and such scar tissue will interfere with the mechanism of the cervix at the time of delivery.

As to the Schroeder operation, it has been found to be an absolute failure. The operation does not remove the entire area of infection in the cervix. To remove the infection, the entire cervical mucosa from the external to the internal os must be removed. The Sturmdorf operation was spoken of as being particularly applicable to older women. The doctor has a wrong conception of the principles of the operation. It is not intended that the operation should be performed in older women alone, but also in women of the child-bearing period, as it is the only method of cure of the condition under discussion. I have performed this operation for about ten years and had the best obstetrical end-results in my cases.

Vaccines, radium, caustics and other methods of cure have been tried in chronic endocervicitis and found to be unsuccessful. The Sturmdorf operation is an excellent and quick way of curing this condition and the ultimate results are good. The patient does not have to be tidied over seven or eight months, and, in the meantime run the possible risk of having the infection produce a certain amount of damage in the uterus, tubes, and ovaries.

DR. FREDERICK G. HOLDEN.—Those who have had no experience with the cautery may find it difficult to see how one can cauterize the cervix without some destruction of the canal, but I must say that no work that we have done has given us such a degree of satisfaction as our work with the cautery. It is possible to take a case with a cervix that fills the vaginal vault, one of those cases with a tremendous endocervicitis with nabothian cysts, and with cautery treatment to see it approaching normal in the course of a month or so, and after several months it will be practically normal except for a small amount of scar tissue. I recall one case operated upon for retroversion in which the cervix was the largest I have ever seen. The patient was going South and before she left I told her she would require an operation on her return and I gave her a few cautery treatments. She came to my office before she left and I found that she would not need the operation. She became pregnant and had a spontaneous abortion; she then became pregnant again, went to term and was delivered. This cauterization is done in the office without the use of an anesthetic. The cervix in most women is almost insensitive. It is seldom necessary to use the cautery more than once, and the cysts do not recur if they are thoroughly cleaned out. By using the cautery on a cervix that is torn and everted, using a dull red heat, the cervix inverts. We even use the cautery as early as eight weeks postpartum. If I were given a choice of only one of the various procedures used today in the treatment of endocervicitis, I would select the cautery.

As to the Sturmdorf operation, it is a good procedure. If anyone speaks disparagingly of it, the reason is that he does not know how to perform it properly. No disparaging remarks are made by those who know how to perform this opera-

tion. I prefer the cautery, however, rather than to expose the patient to the more severe operation and general anesthesia.

DR. McGRATH (closing).—Unfortunately we find that fairly extensive bleeding will occur at times, even after a mild cauterization, but this is decidedly rare. However, we very seldom get a case of severe hemorrhage and none that cannot be easily controlled. It is because of the possibility of hemorrhage and the variation in sensitiveness that I prefer to apply the cautery superficially at first; in other cases, however, I cauterize extensively where the cervix is badly diseased.

In regard to the use of the pessary, I will admit that perhaps six weeks is a better time, though I cannot conceive of any anatomical reason why it should be harmful. Dr. Holaday stated that involution was complete at six weeks postpartum. Does he include involution of the adnexae and uterine supporting elements? It is not uncommon to find involution of the uterus and at the same time relaxation and hyperemia of the vaginal walls. By the use of the pessary to restore normal anatomical relations a better circulation is promoted throughout the pelvis.

It has been my custom to allow a seven to ten day interval between cautery applications, and if one makes six or more applications the extent of the cauterization can be controlled most accurately and with less scar tissue than by making one or two extensive applications.

Dr. Magid mentioned gonorrhea as a cause of endocervicitis. The infrequency with which we find the gonococcus in cases of endocervicitis must be accepted as proof that it is not so frequent a cause as was formerly believed. Abortion, miscarriage or full-term delivery has quite often appeared as the immediate forerunner.

As to the use of the pessary in congenital cases of retroversion, many cases of congenital retroversion are not cured by the pessary but are permanently cured by pregnancy if it supervenes and if these cases are treated properly before, during and after delivery.

Concerning the caustic applications of Strobell, I mentioned this treatment not to recommend it, but because in all fairness to Dr. Strobell he is to be commended for having demonstrated the rôle played by cervical inflammation, though the treatment is probably not without danger. Most of us would be reluctant to criticize Dr. Curtis' use of radium, which is also attended with considerable risk.

The amount of scar tissue that results from the cautery applications, is necessarily problematical. We have not progressed far enough yet to say to what extent the destroyed tissue is replaced by scar tissue, though the replacement is probably at a minimum if a fine needle is used, and that is another reason why I prefer the repeated treatments: that also explains why the use of the large cautery electrode is followed by a large amount of scar tissue.

Regarding the relative advantages of the Sturmdorf and the Schroeder operations, I think Dr. Holden is impartial when he says that the Sturmdorf operation possesses great merit and that when it is properly performed it eradicates the diseased tissue. My criticism has to do only with the technic. I am of the opinion that it is impossible mechanically to draw the vaginal cuff of mucous membrane into the small opening at or near the internal os and obtain good apposition and union without excessive scar. In support of this opinion I may say that we meet cases of atresia where the operation has been performed with very exact technic. With a modification of Schroeder's operation we are able to accurately remove all the diseased area with a minimum destruction of essential cervical tissue.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

New Books

BY ROBERT T. FRANK, A.M., M.D., F.A.C.S., DENVER, COLORADO

A MOST fascinating book is Dakin's translation of Goldschmidt's "The Mechanism and Physiology of Sex Determination."¹ The author reviews the evidence gathered by biologists, and in his concluding chapter seeks to apply the data to the human race.

Some of the fundamental facts that are presented are, that bisexual reproduction is the rule in the animal world. Both the spermatozoon and artificial agents (chemical parthogenesis) result in activation of oxidation processes in the egg. The phenomena of bisexuality can be linked up with heredity and variation. The inheritance of sex corresponds to a Mendelian back cross. A physical explanation for this is found in the difference in chromosomes. Intersexuality, or sex mixture, in moths can reproduce every stage from male to female, in a predeterminable manner. This is gametal (chromosomal) intersexuality. Later in life a hormonal intersexuality (chemical) may occur. For example, in some birds the ovary exerts a repressive influence on the characters of the opposite sex. Gynandromorphism and hermaphroditism are also discussed.

This book is well worth reading by every one interested in biology, "endocrinology" and gynecology. Its strictly scientific attitude, freedom from useless speculation and objectivity is admirable and well worth contrasting—to their detriment—with the three succeeding volumes to be considered.

Gates² attempts to examine the facts of human inheritance and upon these "facts" to discuss intelligent measures which may improve the human race. His discussion of Mendelian characters in plants and animals appears excellent, largely because of his training as botanist and zoologist. When he trenches upon the less well defined characteristics of *homo sapiens* he is sadly handicapped, in some in-

¹**Mechanism and Physiology of Sex Determination.** By Richard Goldschmidt, Director of the Kaiser Wilhelm Institute for Biology, Berlin-Dahlem. Translated by William J. Dakin, Professor of Zoology, University of Liverpool. With 113 illustrations. 1923, George H. Doran Company, New York.

²**Heredity and Eugenics.** By R. Ruggles Gates, Ph.D., F. L. S. Professor of Botany in the University of London and Head of the Department of Botany at King's College; Sometime Associate Professor of Zoology, University of California; Author of "The Mutation Factor in Evolution," etc., 1923, The Macmillan Company, New York.

stances, by quoting the fanciful Berman, accepting Cannon's fear-adrenalin theory without reservation, and not being able to separate the chaff from the wheat. He often fails to appreciate where writers differ according to social or political bias and therefore confuse transient social conditions with stable hereditary factors.

The book however contains much of interest, well presented.

Brown-Sequard, though a well-known scientist, allowed his "rejuvenation" to obtain unsavory notoriety. This was in 1889. Steinaeh, his collaborators and imitators, in recent years have done likewise. Kammerer's³ "Rejuvenation" is an appeal to the laity. He describes most graphically the reenergizing obtained by vasoligation. He claims that cancer and tuberculosis are ameliorated. In women a stimulating dose of x-ray will produce the same effect as vasoligation. The book is well written; its aim evidently is propaganda. Dr. Harry Benjamin vouches for Kammerer, Kammerer endorses Steinaeh. What more can you ask for?

Lorand⁴ presents another brilliantly written book for popular consumption. It is a pity that the book does not end at part two. Part one describes ten life shortening habits (I instance alcohol, sex indiscretion, anger and avoidance of parenthood).

Part two deals with the rapid ageing of women due to smoking, reduction cures, improper diet, anticonceptional practices, etc. Part three is a glorification of rejuvenation by surgical methods, organotherapy, ultraviolet light and radium baths! Would that the masterly style of this versatile author were employed in a worthier cause.

Turning now to books devoted strictly to our special branch let me call attention to Kerr, Ferguson, Young and Hendry⁵ who show the laudable intention of combining "Obstetrics and Gynecology" in one 1000 page volume in order to emphasize the intimacy and interdependence of these allied fields.

The presentation is short, direct and clear. Differential diagnosis is especially emphasized. Much of the obsolete methods of treatment still carried by textbooks has been expunged. From the text it is not possible to tell what field each collaborator has covered. The illustrations are mainly clear pen and ink sketches which necessitate more accurate drawing than is seen in some of the artistic but vague halftone reproductions now the fashion.

I cannot indorse a number of measures advocated by the authors, such as chloroform for the convulsions of eclampsia, active intervention in abortion, sea-tangle tents for cervical dilatation, "light" curettage and "disinfection" of the puerperal uterus in "sapremia" and septic endometritis, abdominal section in severe acute gonorrheal salpingitis. The conservative treatment of accidental hemorrhage by morphine and pituitrin is of interest and worth bearing in mind.

³**Rejuvenation, and the Prolongation of Human Efficiency.** Experiences with the Steinaeh Operation on Man and Animals. By Dr. Paul Kammerer. With an introduction by Dr. Harry Benjamin. Illustrated. 1923, Boni and Liveright, New York.

⁴**Life Shortening Habits and Rejuvenation.** By Arnold Lorand, M.D. Carlsbad, Czecho-Slovakia. 1923, F. A. Davis Company, Philadelphia.

⁵**A Combined Textbook of Obstetrics and Gynecology.** By J. M. Munro Kerr, M.D., F.R.F.P. and S., Glasgow; James Haig Ferguson, M.D., F.R.C.S., Edinburgh; James Young, D.S.O., M.D., F.R.C.S., Edinburgh, and James Hendry, M.A., B.Ss., M.B., 1923, William Wood & Company, New York, E. & S. Livingstone, Edinburgh.

Graves' Gynecology⁶ continues to prove a popular textbook. As heretofore considerable space is devoted to endocrinology, renal and rectal diseases. The arrangement continues unchanged. Graves appears to have accepted unreservedly Sampson's interpretation of "chocolate cysts" of the ovary.

The author might well omit his method of performing "anterior colpoplasty," label "Ward's method" for cystocele "Hadra's operation" if any one name is to be associated with the bringing together of the pubo-cervical fascia, and make clearer in the text that hysterectomy is not the operation of choice for prolapse. Incidentally if this book wants to remain "up to the minute," as the publishers announce, it would be well to describe Stoeckel's utilization of pyramidalis fascia flaps for the relief of incontinence of urine.

The new edition of Doederlein and Krönig⁷ as heretofore remains the most acceptable guide to gynecological operative technic. No startling changes are recorded. The surviving author, Doederlein, continues a strong advocate of the radium and x-ray treatment of cervical cancer. His five year statistics of cures in rayed cases is the same as that for patients who underwent a radical operation.

Why Doederlein fails to modify the operation for cystocele, contenting himself with the old Stoltz anterior colporrhaphy, is a mystery. In Germany Martin has described an excellent technic.

The Goebell-Stoeckel operation for urinary incontinence is beautifully illustrated. Another new operation is Bumm's collifixation for total prolapse.

Weibel,⁸ with commendable loyalty to his defunct chief, Wertheim, has written a short but most complete textbook which covers the gynecologic technic as developed at Wertheim's clinic. The book is of interest to the beginner as well as to the specialist because both elementary questions as well as minutiae of technic are dealt with. Part one deals with extirpation methods—removal of uterus, tubes and ovaries from above and below. Part two is regional and takes up vaginal plastic operations, including those for vesico-vaginal fistula, vaginal interposition of the uterus with and without shortening of the sacrouterine ligaments, and the almost obsolete recto-vaginal interposition. The radical operation for carcinoma of the cervix is especially well described. Conservative operations on the uterus and adnexa are fully dealt with.

The numerous illustrations, the strict limitations of the text to technic, the great detail given, make this book a most useful guide to the gynecologist.

Adami's David Lloyd Robert's Lecture, dealing with Charles White

⁶Gynecology. By William P. Graves, Professor of Gynecology at Harvard Medical School, Surgeon-in-Chief to the Free Hospital for Women, Brookline, etc. With 388 half-tone and pen drawings by the author, and 146 microscopic drawings, with 103 of the illustrations in color. Third Edition, thoroughly revised. Philadelphia, 1923, W. B. Saunders Co.

⁷Operative Gynaekologie. Von Doederlein-Kroenig. Bearbeitet von Albert Doederlein. Professor der Geburtshilfe und Gynaekologie, Direktor der Universitäts-Frauenklinik in Muenchen. Fuenfte Auflage. Mit 443 teils farbigen Abbildungen und 16 farbigen Tafeln. 1924, Georg Thieme, Leipzig.

⁸Die Gynaekologische Operationstechnik der Schule Ernst Wertheims. Herausgegeben von Professor Dr. Wilhelm Weibel, Primararzt an der Rudolfstiftung in Wien. Mit 300 Abbildungen. Berlin, 1923, Verlag von Julius Springer.

of Manchester⁹ is an interesting, even if biased, presentation. White evidently was a skillful, clean obstetrician who considered foul air, filthy bedding, a retention of lochia the chief cause of puerperal fever. According to the evidence presented by Adami nothing appears to show that White considered disinfection of the hands necessary. It seems justified to conclude that the horrible hospital epidemics of those times could be avoided by moderate sanitation of the wards. Collins of the Rotunda in 1826 put a stop to an epidemic by chlorinating the wards. Adami's vitriolic attack on Sir Wm. J. Sinclair, for his publication of Semmelweis' achievement, appears astonishing and quite unwarranted. What local undercurrents of Manchester medical politics inspired this attitude is a sealed chapter to me.

Two further volumes of Pfaunder and Schlossmann's Handbook of Children's Diseases have appeared.¹⁰

Volume two deals with infectious diseases. Among the less well-known varieties the "fourth disease," Weil's disease, epidemic encephalitis and poliomyelitis receive careful attention. Serum disease is treated in an appendix.

Volume three describes diseases of the digestive apparatus, including the metabolism of the infant, the intestinal flora and important sources of poisoning. Two hundred pages are devoted to diseases of the respiratory apparatus, and the final hundred pages treat of cardiac, vascular and lymph-glandular troubles.

The format, colored and halftone illustrations continue to be of the same exceptional quality as in volume one.

The translation of Braun's book¹¹ from the sixth German edition edited by Malcolm L. Harris of Chicago is of interest to every surgeon. One hundred and forty-three pages are devoted to introductory topics including the properties, both chemical and physiologic, of most of the local anesthetics and the factors which aid or hinder in their application. The next 60 pages are devoted to general technique, while the concluding 200 pages deal with regional application. The book is a valuable guide to local anesthesia; its value is enhanced by Harris's editorial additions. Of especial importance are the discussions of infiltration and conduction anesthesia regionally applied.

The next volume may be used as a valuable adjunct to Braun's treatise, for Finsterer's¹² Local Anesthesia Methods, translated by Burke, deals at great length with the abdomen. Finsterer claims that local anesthesia avoids deaths from shock even in the aged and debilitated (639 gastric and 163 intestinal resections), reduces postoperative gastric dilatation to a negligible quantity, and almost abolishes postoperative vomiting. Intestinal atony, as an operative sequel, is

⁹Charles White and the Arrest of Puerperal Fever. With which are reprinted Charles White's published writings on Puerperal Fever. By J. George Adami, C. B. E., M.D., F. R. S., Vice-Chancellor of the University of Liverpool. New York, 1923, Paul B. Hoeber, Inc.

¹⁰Handbuch der Kinderheilkunde. Herausgegeben von Professor Dr. M. von Pfaunder und Professor Dr. A. Schlossmann. Vier Bände mit 70 meist farbigen Tafeln und ca. 500 Textfiguren. II und III Band, Dritte Auflage mit 29 Tafeln und 260 Textfiguren. Leipzig, 1923, Verlag von F. C. W. Vogel.

¹¹Local Anesthesia. Its scientific basis and practical use. By Professor Dr. Heinrich Braun, Director of the kgl. Hospital in Zwickau, Germany. Translated and edited by Malcolm L. Harris, M.D., Professor of Surgery, Chicago Polyclinic, etc. Second American from the sixth revised German edition. With 231 illustrations in black and colors. 1924, Lea & Febiger, Philadelphia and New York.

¹²Local Anesthesia Methods and Results in Abdominal Surgery. By Professor Dr. Hans Finsterer, Surgeon-in-Chief, Vienna Hospital of the Brothers of Charity, with 42 illustrations, Authorized English Version. By Joseph P. F. Burke, M.D., Sc.D., LL.D., Buffalo, N. Y., New York, 1923, Reiman Company.

said to have disappeared since he employs local anesthesia. He warns against induction of posterior splanchnic anesthesia (by the Kappis method) except in the sitting posture and prefers the anterior route through the opened abdomen (Braun's technic). For the pelvic organs he recommends parasacral narcosis.

The book contains many valuable details of operative technic, especially applicable to the gastrointestinal tract. The smoothness of the translation could bear improving.

Paramore¹³ has written a small brochure on the toxemia of intestinal obstruction, in which he concludes that the symptoms are not due to a toxic agent but result from the increase in abdominal pressure. He also applies his theory to eclampsia.

Deluca¹⁴ offers a monograph on arterial tension and blood viscosity during pregnancy, labor and the puerperium, containing many graphic charts.

Watson's treatise on "Hernia"¹⁵ is a complete, detailed, well-balanced monograph which it is both pleasant and profitable to study.

The text is clear, the arrangement good, the descriptions are ample but not verbose. Excellent artistic illustrations by W. C. Shepard illuminate the text. The end of each chapter has a short but good bibliography. Much space is devoted to the commoner varieties of hernia, inguinal, femoral, and umbilical, but the rare varieties are fully discussed. Operative methods are very well described. This book is most worth while.

Adams¹⁶ in the second edition of the book, which first appeared written by himself and Cassidy covers all acute intraabdominal conditions from the viewpoint of the general practitioner. The volume forms a very readable elementary guide, which deals with all surgical diseases of the abdomen including gynecologic ailments. It carries no appeal to the trained surgeon.

Evans¹⁷ diseases of the breast is a strange book to appear from the University of London Press. I repeatedly looked at the title page to assure myself that the year of publication was really 1923! The great majority of literature quoted is of the last century, and much of it before 1890. This book which is meant to describe "the present state of our knowledge" has three rather crude drawings of a dissection of the axilla, but, except for numerous diagrams of skin incisions, not a single illustration of the steps of the radical operation for removal of the breast. On the other hand there are at least five full page drawings of breast bandages worthy of an elementary compend for students.

As a reference book to rare breast conditions, to the observations of

¹³**The Toxemia of Intestinal Obstruction.** By R. H. Paramore, F.R.C.S., Hon. Surgeon and Gynaecologist, Hospital of St. Cross, Rugby, etc. London, 1923, H. K. Lewis & Co.

¹⁴**Tension Arterial y Viscosidad Sanguinea en Obstetricia.** Par Dr. Francisco A. Deluca, Prosector de la Clinica Obstetrica y Ginecologia. Buenos Aires, Imprenta Mercatalli, 1923.

¹⁵**Hernia. Its Anatomy, Etiology, Symptoms, Diagnosis, Differential Diagnosis, Prognosis, and Operative Treatment.** By Leigh F. Watson, M.D. Associate in Surgery, Rush Medical College, Chicago, Ill. 232 Original Illustrations, By W. C. Shepard. St. Louis, 1924, C. V. Mosby Co.

¹⁶**Diagnosis and Treatment of Acute Abdominal Diseases.** Including Injuries and Complications of External Hernia. By Joseph E. Adams, Surgeon to St. Thomas's Hospital, etc. Second Edition, 1923, William Wood and Company, New York.

¹⁷**Diseases of the Breast.** By Willmott H. Evans, Consulting Surgeon of the Royal Free Hospital. With 106 illustrations, of which 15 are colored. 1923, University of London Press Ltd., London.

Astley Cooper, Billroth, S. W. Gross and other surgeons of the middle of the last century, as an atlas of colored illustrations made from rare English museum specimens, the volume has its value. As a modern treatise it is an absolute failure.

Human Protozoology by Hegner and Taliaferro¹⁸ is a thick but compact volume designed for the student, health officer and physician. The new valuable data on human protozoa obtained during the World War are here for the first time gathered. The huge material does not lend itself to review. The book is of great value as a reference handbook to all who are interested in the causation of diseases.

The most striking features of Marion and Heitz-Boyer's¹⁹ textbook of Cystoscopy and Ureteral Catheterization are the numerous and superb colored plates which give to the volume the value of a complete atlas. The description of the optics and methods of employing a cystoscope is concise and clear. A chapter is devoted to the changes due to gynecologic conditions (cervical cancer, uterine fibroid, prolapsus) and pregnancy. Much importance is attached to urethroscopy, to cystoscopic methods of bladder treatment, pyelography, functional test of the urine and blood, expulsion of ureteral stones by means of the ureter catheter, etc. This is a complete and valuable treatise.

Casper's²⁰ textbook of urology and of male sexual diseases is in its fourth edition. It covers the entire field of male genital diseases, urethra, bladder, ureter and kidney. Taken together with the second edition of his "Handbook of Cystoscopy" (1923) the two form a valuable treatise which, however, pays no special attention to the wants of the gynecologist. The newer findings relating to the nephritides, to pyelography and radiography have been added. Blood chemistry has been seriously slighted.

Montague²¹ has devoted 180 pages to pruritus ani et vulvae. He gives a good description of the pathology, which, in short, is a simple chronic dermatitis, with acute exacerbations or a final atrophy. His descriptions are often unduly detailed as for example that of the action of bromides. Many remedies, as heretofore, are advised.

Vignoli's²² manual of human embryology is an elementary book designed for the first year medical student. The exposition is clear, the diagrams are instructive and much of interest will be found in its pages. For instance, he shows that the spermatozoon has to traverse 8, 8 meters to reach the ovum!

Zieler²³ has written a short but accurate account of the diagnosis

¹⁸Human Protozoology. By Robert W. Hegner, Ph.D., Professor of Protozoology, and William H. Taliaferro, Ph.D. Associate Professor in the School of Hygiene and Public Health of the Johns Hopkins University. 1924, Macmillan Co. New York.

¹⁹Traite Pratique de Cystoscopie et de Catheterisme Ureteral. Par Professeur G. Marion et Professeur M. Heitz-Boyer, Deuxieme Edition, Entierement Refondue, Avec 60 Planches hors texte en noir et en couleurs, Paris, 1923, Masson et Cie, Editeurs.

²⁰Lehrbuch der Urologie. Von Dr. Leopold Casper, Professor Universitaet Berlin. Vierte, neu bearbeitete und vermehrte Auflage. Mit 225 teils farbigen Abbildungen und 2 farbigen Tafeln. 1923, Urban & Schwarzenberg, Berlin und Wien.

²¹Pruritus of the Perineum. (Pruritus Ani, Vulvae and Scroti). By Joseph Franklin Montague, of the Rectal Clinic, University and Bellevue Hospital Medical College, etc. With 37 Illustrations. New York, 1924 Paul B. Hoeber, Inc.

²²Manuel D'Embryologie Humaine. Par J. Vignoli, Aide d'Anatomie et de Physiologie à l'Ecole de Medecine de Marseille. 196 figures, 8 planches couleurs. 1923, A. Maloine & Fils, Paris.

²³Die Geschlechtskrankheiten. Ein Grundriss fuer Studierende und Aerzte. Von Dr. Karl Zieler, Professor und Vorstand der Universitaetsklinik fuer Haut und Geschlechtskrankheiten in Wuerzburg. Mit 17 Abbildungen im Text and 1 Tafel. Zweite vermehrte Auflage. 1922, Verlag von Georg Thieme, Leipzig.

and treatment of gonorrhea, soft chancre and syphilis. This little compend is of value for the student and practitioner.

Doederlein's²⁴ pocket compend of obstetrics is now in its fifteenth edition. The authority of its writer, his huge experience as a teacher, and the numerous illustrations lend to this small volume a value far above that of the usual compend.

This second edition of Bacon's "Obstetrical Nursing"²⁵ is very satisfactory. It gives the obstetrical nurse an excellent guide to her actions, duties and obligations. As, according to the author, in exceptional instances, the nurse may be required to actively combat emergencies he instructs her how to make vaginal examinations and how to tampon in placenta previa. Let us hope that she may never be called upon to do the latter.

Josephine Baker²⁶ has had a huge experience which well qualifies her to write the three popular books "Healthy Mothers," "Healthy Babies" and "Healthy Children." These subjects are illuminatingly and tactfully treated. The first book deals with the mother from conception to the lying-in period. I would suggest that coitus be positively interdicted during the last two months, and that sponge baths be substituted in all cases during this same period for tub baths. It is hazardous to recommend a vaginal douche during pregnancy without a physician's supervision.

Healthy Babies and Healthy Children are very satisfactory, neither pedantically nor vaguely written, and therefore likely to prove of real help to parents.

In these days of new developments, rapid changes and many inventions, an up-to-date dictionary is a requisite.

The twelfth edition of Dorland's²⁷ contains 3000 new words. Special attention has been given to chemistry and to dental terms. The volume is compactly and attractively gotten up, with a thumb index to aid in ready reference.

In conclusion I desire to refer to the booklets published under the auspices of the National Health Council. They are nontechnical, destined for the lay public, sound, and written by accepted authorities. Their wide distribution can do much to educate the laity and help to crowd out some of the so-called "popular" books of information many of which are little better than advertising from motives either personal, proprietary or to advance some cult.

The following 14 little volumes have appeared:

The Baby's Health. By Richard A. Bolt, M.D., Gr.P.H.

The Young Child's Health. By Henry L. K. Shaw, M.D.

²⁴*Leitfaden fuer den Geburtshilflichen Operationskurs.* Von Dr. Albert Doederlein, Geh. Hofrat, Professor der Geburtshilfe und Gynaekologie der Universitaets-Frauenklinik in Muenchen. Vierzehnte und fuefzehnte Auflage. Mit 173 Abbildungen. 1923, Verlag von Georg Thieme, Leipzig.

²⁵*Obstetrical Nursing.* A manual for nurses and students and practitioners of medicine. By Charles Summer Bacon, Ph.B., M.D., Professor of Obstetrics in the University of Illinois and in the Chicago Polyclinic; Medical Director in the Chicago Lying-in-Hospital and Dispensary, etc. Second edition, thoroughly revised. 1924, Lea & Febiger, Philadelphia.

²⁶*Healthy Mothers, Healthy Babies, Healthy Children.* All three books written by Josephine Baker, M.D., Director, Bureau of Child Hygiene, New York City, etc. Boston, 1923, Little, Brown, & Co.

²⁷*American Illustrated Medical Dictionary.* A new and complete Dictionary of the terms used in medicine, surgery, etc. Pronunciation, derivation and definition. By W. A. Newman Dorland, A.M., M.D., F.A.C.S., etc. Twelfth edition, revised and enlarged. Philadelphia, 1923, W. B. Saunders Co.,

Personal Hygiene, The Rules for Right Living. By Allan J. McLaughlin, M.D.

The Human Machine. By William H. Howell, Ph.D., M.D., LL.D., ScD.

Food for Health's Sake, What to Eat. By Lucy H. Gillett, A.M.

The Quest for Health. Where it Is and Who Can Help Secure it. By James A. Tobey.

Taking Care of Your Heart. By T. Stuart Hart, A.M., M.D.

Cancer, Nature, Diagnosis, and Cure. By Francis Carter Wood, M.D.

Community Health, How to Obtain and Preserve it. By Donald B. Armstrong, M.D., ScD.

Man and the Microbe. Charles-Edward Amory Winslow.

The Expectant Mother, Care of Her Health. By R. L. DeNormandie.

Love and Marriage, Normal Sex Relations. By T. W. Galloway.

Tuberculosis, Nature, Treatment, and Prevention. By L. R. Williams.

Veneral Diseases, Their Medical, Nursing, and Community Aspects. By W. F. Snow.

They are published by Funk & Wagnalls Company, New York and London, 1924.

Selected Abstracts

Breast

Greig: Puberal Mammary Hypertrophy. Edinburgh Medical Journal, 1922, xxviii, 153.

In a girl of fourteen and a half, enlargement of the breasts was first noted two months after the onset of menstruation. The breasts were of unequal size. The left breast measured eight inches vertically by eleven horizontally. Except for a few sparse hairs the external genitals retained their infantile characteristics. Necrosis of the superficial tissues over the breast began about five months after the condition was diagnosed and the girl died soon after from a systemic extension of the local infection. Operation was not considered wise in this case because of complicating conditions. Autopsy showed the breast condition to be a glandular hyperplasia of nodular form. Microscopically the gland structures were mainly fibrous with an altered epithelium in the gland spaces. The uterus and ovaries were normal for the age.

Examination of the literature revealed only 26 verified and 20 unverified cases of puberal mammary hypertrophy. The normal increase in the female breast at puberty is more a fatty overgrowth of the envelope than a glandular atasis, the reverse is true in pregnancy. With pregnancy excluded the common cause of progressive bilateral mammary hypertrophy is chronic mastitis. Pathologically the breast changes in puberal mammary hypertrophy resemble those occurring normally in pregnancy. A rapid change from the infantile condition of the uterus and ovaries does not accompany this condition. In physiological enlargement of the breast the stimulus comes undoubtedly from hormonal changes. Puberal hypertrophy suggests a want of control of the process stated.

Death occurring in these cases is almost without exception due to septicemia following local necrosis from defective cell nutrition. The 5 unoperated cases

in this series all died from this cause. The treatment is surgical. In 5 cases an interval of from one week to six months elapsed between the removal of the two breasts. Should there be a considerable difference in the degree of affection of the breasts, removal of the larger is justified, the other probably will atrophy. This diminution in size after unilateral amputation suggests that the hormonal auto acid may come from the glands themselves. The hormone associated with pubertal hypertrophy is not a galactagogue and subsequent pregnancy has been noted to produce no secretion in a breast once so affected. When by pathological overgrowth the mammary activity becomes exhausted we are left with ovaries and uterus in the prime of activity. Pubertal mammary hypertrophy is a disease *sui generis* having distinctive symptoms and urgently necessitating a definite surgical procedure.

H. W. SHUTTER.

Rosenburg: Menstrual Changes in the Breast. Zentralblatt für Gynäkologie, 1923, xlvii, 111.

Changes in the breast incident to pregnancy have long been known, but Rosenburg draws attention to a cyclic change in the breast, notably a premenstrual hypertrophy. This alteration in the breast has been associated with the premenstrual swelling of the uterus, and has been attributed to a secretion of the corpus luteum. A curve may be plotted more or less parallel to the well-known menstrual curve of Schröder. The change in the breast for lactation does not appear to be due in any particular way to the presence of the corpus luteum of pregnancy, a matter of considerable medico-legal importance.

LITTLE.

Perkins: Supernumerary Breast on Buttock. Journal American Medical Association, 1921, lxxvi, 792.

A white married man of masculine development and with two normal male breasts, has a fully developed breast on his right buttock. It is the size of an orange, has a well-developed nipple and sags like a breast in a woman of his age (59). At from 17 to 33 yrs. of age, the breast secreted monthly for a few days at a time so that he was obliged to wear a pad. Beside this, the breast caused no inconvenience.

R. E. WOBUS.

Lewis and Wells: The Function of the Colostrum. Journal American Medical Association, 1922, lxxviii, 863.

The question as to whether colostrum is merely an intermediary stage in the production of milk or whether it has a definite function, has long been a matter of speculation. In recent years the subject has been approached in a more definite manner. From these studies the conclusion has been reached that the colostrum is a very important factor in the production of immunity in infants.

Previous investigators had established the fact that, in addition to the usual amount of milk albumin and casein, colostrum contains as much as 8 per cent of globulin. This globulin is identical with blood globulin, while milk albumin differs decidedly from blood albumin. It has been further demonstrated that when the mother exhibits a certain immunity, this immunity is not present in the infant until it has imbibed the mother's colostrum. It has also been found that the colostrum is very rich in these immune bodies, that they occur there in greater concentration than in the mother's blood and that they diminish in the mother's blood soon after parturition. It has also been found that the newborn absorb certain albuminoid bodies very rapidly. In the calf it was found that while specific agglutinins for *B. abortus* were absent at birth, they appeared in the blood half

an hour after the calf had ingested colostrum. It was also found that euglobulin, which seems associated with the immunity bodies, occurs in the calf's blood only after the ingestion of colostrum.

From a review of the literature supplemented by their own researches, Lewis and Wells conclude that the colostrum is essential in conferring immunity to the newborn and that consequently there can be no suitable substitute for human colostrum.

R. E. WOBUS.

Bedo, F.: The Care of the Breast in Nursing Mothers. *Medizinische Klinik*, 1922, xviii, 928.

The care of the breast in nursing mothers is a problem for both obstetrician and pediatrician. The affections of the nursing breast are due to three factors, wrong technic of nursing, lack of skill on the part of the mother and doctor, and uncleanness. Almost every primipara nurses her baby in the wrong way. Instead of having the baby grasp the areola, only the nipple is permitted to be compressed by the child's jaws. Continued action upon the nipple by the hard jaws produces fissures and these are the portals of infection.

Special care of the nipples during pregnancy is not as necessary as some men believe except when the nipple is small or inverted. Simple washing with soap and water and drying is sufficient.

A newborn baby should be put to the breast 6 to 8 hours after birth and should be left for only a few minutes. Leaving the child at breast too long brings about maltreatment of the nipple. Most fissures of the nipple occur during the puerperium when the patient is still in bed. In these cases it is advisable to have the patient sit up while nursing. Should the cracks occur later, when the patient is up and about, it is better to have the patient in a reclining position when nursing the baby. The change of posture will prevent the child from touching the tender areas with its gums. Locally alcohol should be applied and also a solution containing tannic acid (1.0), anaesthesin (0.5) and glycerin (10.0). This is permitted to dry and a gauze dressing applied. When the breast is hard and tender and masses are found, it is essential to forcibly empty the breast before each nursing with the Bier pump. In the presence of pus, surgical measures are taken but the bandage should be so applied that the child will be able to nurse.

J. P. GREENHILL.

Dorman and Mossman: Puerperal Mastitis. *Journal American Medical Association*, 1921, lxxvii, 509.

In 2000 consecutive patients delivered at the New York Woman's Hospital there occurred 57 cases of mastitis or 2.8 per cent. Observations at this institution support the contention of De Lee that infections of the infant are an important etiological factor. Infections usually occurred in the second week postpartum. The number of breast abscesses was 0.4 per cent.

Among prophylactic measures, the authors believe that cleanliness is of first importance and that, in the case of depressed nipples, massage is advantageous. After delivery, they advocate nursing periods of from three to five minutes at from four to six hour intervals until the milk appears. For damaged nipples they use tincture of benzoin or bismuth and castor oil, or the nipple shield. In the interval the nipples are protected by a gauze pad held in place by adhesive strips. They think this dressing has decreased the number of cases under their care. Accepting the use of the binder, catharsis, the limitation of fluids and the ice bag, they believe the breasts are best emptied by the infant until suppuration sets in.

Massage and pumping may supplement nursing but must be carefully employed.

In case of suppuration, heat is applied, nursing and breast manipulation are stopped, free incision with counter drainage is instituted and the cavity irrigated with Dakin's solution.

R. E. WOBUS.

Temesvary: The Treatment of Puerperal Conditions of the Breast with Light. Zentralblatt für Gynäkologie, 1923, xlvii, 1513.

The writer has made use of the Engelhorn lamp in certain cases of parenchymatous mastitis, and reports favorable results in three cases. The application lasted from forty minutes to an hour and a half, though in one case there was a small burn from a sixty minute exposure. In general it seems advisable to radiate the nipple alone, which apparently results in mild lessening of the pain. The cure is probably biological, produced by the factor of light and heat.

LITTLE.

Baer: Breast Infections: Surgery, Gynecology and Obstetrics, 1921, xxxii, 353.

In the Michael Reese Maternity from Jan. 1, 1917, to Oct. 1, 1918, there was a total of 2,323 cases with 5 cases of breast abscess. From Oct. 1, 1918 to Dec. 1, 1919 there were 1,212 cases with 17 breast abscesses. It was surmised that the influenza epidemic might be responsible for this increase. Baer, therefore, sent a questionnaire to 29 other maternities of which, however, only two had noted such increase. The questionnaire covered a number of other points and showed, e. g. that the methods used for preventing and treating breast abscess are very similar in most lying-in hospitals.

R. E. WOBUS.

Nürnbergger: The Complications of Puerperal Mastitis. Deutsche Medizinische Wochenschrift, 1922, xlviii, 354.

While the prognosis of puerperal mastitis is usually favorable, Nürnbergger calls attention to the fact that it may give rise to various complications and may even be followed by death. Among the complications which have been encountered by himself and other observers he mentions metastatic abscesses in various parts of the body, parotitis, thyroiditis, endocarditis and pericarditis, pleurisy, osteomyelitis and infections of the kidney and of the liver.

The treatment of these complications will vary with their nature. Surgical lesions usually require drainage. Nürnbergger thinks that vaccines and injections of some of the casein preparations should be used in all cases, even in early cases of mastitis. In the latter instance, he feels that the process may be shortened or, if used very early, the infection may be checked completely.

R. E. WOBUS.

Grynfeldt, E., and Tzelepoglou, C.: The Galactoele: Gynécologie et Obstétrique, 1922, v, 105 & 204.

The authors conclude that the galactoele is not a disease entity but that it is a secondary condition arising from various pathologic states of the mammary gland. Anatomically they distinguish: ectatic galactoele, interstitial galactoele, adeno-galactoele, and pyo-galactoele. They think the conditions arise: (1) From inflammatory affections which give rise to varying anatomic conditions depending on the intensity, location, etc. of the inflammation; (2) From traumatism resulting in rupture of the lactiferous ducts. The authors found that the adeno-galactoele was the most common form. The anatomic pictures were quite complex and one might speak of mixed galactoeles. They think that the clinical course varies with

the anatomic type and that the treatment differs with the different varieties. Puncture, incision, or excision may be indicated.

F. L. ADAIR.

Sistrunk: Cancer of the Breast with a Study of the Results Obtained in Two Hundred and Eighteen Cases. *Pennsylvania Medical Journal*, 1921, xxiv, 781.

The report covers the follow up work on 218 of the 246 cases of breast cancer (all women) operated at the Mayo Clinic in 1911, 1912 and 1913. Investigators have shown that the lymphatic chains from the breast drain into the subclavicular region, the opposite axilla and under the sheath of the rectus muscle as well as into the corresponding axilla. In the technique employed both pectoral muscles, a portion of the upper rectus fascia, the subscapular and axillary lymphatics were removed.

Extension present at the time of operation gave the key as to prognosis. Sixty-four per cent of the 86 patients without and 19 per cent of the 132 patients with primary gland involvement are alive five to eight years after operation. Sixty and one half per cent of the patients had primary gland involvement. In women with gland involvement, the outcome was twice as favorable after the menopause as before, 24.6 per cent and 12.7 per cent respectively being alive. Because of the subsequent increase in lymphatic supply to the breast incident to pregnancy, the prognosis in parous women was less favorable. Two cases pregnant at the time of operation have died since. Four patients still lactating when operated have all died in the five year period. Ulceration is a bad prognostic sign. Tumors attached to the skin were usually superficial. The highest percentage of cures was obtained in tumors of the upper inner quadrant, the lowest in the lower inner quadrant.

Of the 97 patients where the location of recurrence was ascertainable, local, or local involvement plus metastasis occurred in 47.4 per cent. Of the cases operated for cancer of the breast, metastasis occurred in the chest in 9.6 per cent, the bones 7.8 per cent, the abdomen in 5 per cent, the brain 1.4 per cent and in the opposite breast in 2.7 per cent. Fourteen out of 17 cases of bone metastasis occurred in the spine. In 81 per cent of 104 cases the cause of death is known. The primary operative mortality was 4 per cent. Eleven women died from causes other than recurrence. Fifty-five per cent of the total number of cases were dead at the end of five years. Two and three tenths per cent died later. At the end of five years 65.1 per cent of the cases without primary gland involvement were alive. When followed by the radical operation the results obtained by simple removal of the tumor for diagnosis are not necessarily bad, provided the tumor is not cut into during its removal. The author feels that little progress is to be made by changes in technique. With early treatment 75 to 80 per cent of the cases are curable.

H. W. SHUTTER.

Handley, W. Sampson: Lines of Advance in the Surgery of Breast Cancer. *British Medical Journal*, Jan. 8, 1921, 37.

The author emphasizes the importance of avoiding incomplete operations for cancer of the breast. He doubts the possibilities of extending the complete operations which have already been established. He advocates the use of the x-ray and radium in addition to operative procedures. He points out that the x-ray is more applicable for cases requiring diffuse radiation, whereas radium is better where small areas are to be reached. He thinks that preliminary radiation with x-ray is beneficial and that it may convert an inoperable tumor to an apparently operable one. He advises the prophylactic use of radium at the time of operation, apply-

ing 25 or 50 mg. tubes to localized areas especially the intercostal and supraclavicular glands. He also urges the importance of open air treatment as a prophylaxis against recurrence and as being helpful in forms of inoperable cancer.

F. L. ADAIR.

Items

To the Editor:

Two statements in the recent most interesting paper of M. R. Robinson and B. Zondek, "Experimental Attempts to Promote Uterine Growth," which appeared in the July issue of your Journal, require correction.

The authors state that Wintz (Arch. f. Gynäkologie, 1920, exiii, 457) "conceived the idea of utilizing the liquor follicle in its unaltered state, for therapeutic purposes. The results were far beyond his expectations, etc." *His expectations must have been most modest* for to use Wintz's words, "Aus diesen kurz angeführten Resultaten lässt sich also ersehen, dass irgendwelche typische Reaktion, ausgelöst durch den Follikelsaft, nicht beobachtet werden kann," which translated verbatim reads: "From these briefly reported results, one can see, that no typical reaction whatever, ascribable to follicle juice, can be noted."

Wintz also obtained negative results in studying the effect upon the genital tract of rabbits when using follicle juice. I, perhaps because I employed larger dosage, was able to develop marked genital growth phenomena in rabbits by injecting follicle fluid. This observation should certainly not be classed as "continuing the experiments of Wintz," as Robinson and Zondek put it.

My main reason, however, for penning this communication is to make perfectly clear that the meaning read into the quotation from one of my papers (Frank, R. T., and Rosenbloom, J., Surg. Gyn. and Obst., 1915, xxi, 646) by Robinson and Zondek is their own, and is not shared in any way by me, as the unwary reader might mistakenly be led to conclude.

The quotation referred to the fat soluble extracts of the placenta and reads "that the extract containing all of the fat soluble substances is by far the most potent." Robinson and Zondek from this appear to draw the conclusion that "This fact has a vital bearing upon the pharmacology of organic extracts, and furnishes the axiom, that, just as endocrinopathies are due to pluriglandular disturbances, so is the active principle of the ductless gland not contained in any singular (single?) portion of the gland, but in the gland as a whole." The italics are theirs.

My own deduction from the fact that the entire alcohol soluble

portion (for this was found to be the universal solvent) was more potent than any fraction obtainable, was far less far reaching than that of Robinson and Zondek. I concluded that loss of active substance occurred during the fractionating, which conclusion has been borne out by all my later work. I might add that it appears distinctly hazardous to base far-reaching generalizations upon such a slender foundation.

Very truly yours,
ROBERT L. FRANK.

July 24, 1924, Denver, Colo.

Increase in Size and Subscription Price

The amount of excellent material that is being offered to the Journal and that should be published has made it necessary that we increase its size and therefore unavoidably also the subscription price.

This change will take effect with the October issue. From that date on between sixteen and thirty-two pages will be added in each number, while the subscription price will be increased only one dollar per annum.

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